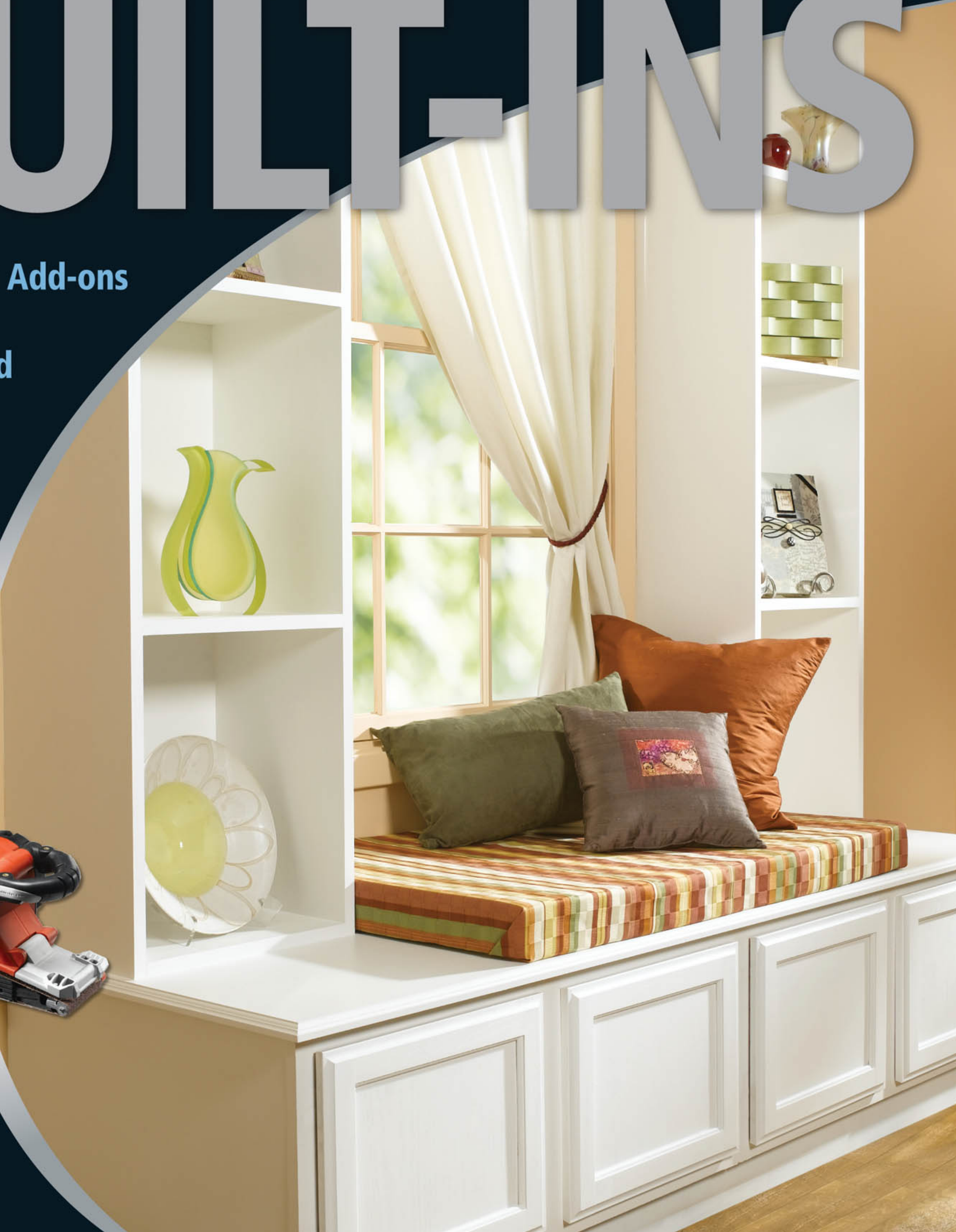
BLACK&DECKER®

THE COMPLETE GUIDE TO

CUSTOM SHELVES & BUILT-INS

Build Custom Add-ons to Create a One-of-a-Kind Home



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CUSTOM SHELVES & BUILT-INS

Build Custom Add-ons to Create a One-of-a-Kind Home

by Theresa Coleman

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international

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NOTICE TO READERS

For safety, use caution, care and good judgment when following the procedures described in this book. The Publisher and Black & Decker cannot assume responsibility for any damage to property or injury to persons as a result of misuse of the information provided.

The techniques shown in this book are general techniques for various applications. In some instances, additional techniques not shown in this book may be required. Always follow manufacturers' instructions included with products, since deviating from the directions may void warranties. The projects in this book vary widely as to skill levels required: some may not be appropriate for all do-it-yourselfers, and some may require professional help.

Consult your local Building Department for information on building permits, codes and other laws as they apply to your project.

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Introduction

Get ready to flex your carpentry muscles and improve your home with a little help from stock and semi-stock cabinets.

Built-ins are no longer just for kitchens. With the range of available cabinet sizes, finishes, and organization accessories available in stock and semi-stock styles, combining cabinets and standard sheet goods to create custom looks for your favorite rooms is a realistic option to buying the pre-made shelves and hutches that everyone else in your neighborhood owns.

We designed the one-of-a-kind projects in this Complete Guide to live up to the essence of the title—"complete"—without making the projects too tough for weekend DIYers. The result: A variety of fun projects for various skill levels with a range of design styles for rooms all over your house.

If you like the look of sleek urban style, check out The Club Bar (page 168). Its slick modular palette is a total attention grabber that you might find in an avant-garde city hotel. The classically appointed Formal Bookcase (page 188), on the other hand, is DIY-friendly project inspired by traditional hardwood libraries.

Chasing the brass ring of good design inspired more than just a hip-traditional design stew. It begged us to be mindful of the permanence of these projects. Sure, the projects are fun to create, but we took the nature of a built-in seriously. When you create a built-in or add shelving, it becomes part of your home, part of your day-to-day reality—whether your built-in is used to store laundry detergent, display cherished mementos, or curl up with a favorite book.

We crafted projects that you can build, projects with rock-solid, real-world assembly and fabrication techniques. And, since many of the designs include semi-stock cabinets, the carpentry skills needed aren't furniture grade. Personally, I like to think of this guide as the carpentry equivalent of using a cake mix: You still have to add a few of your own ingredients, but you get to skip a few steps with the pre-made mix.

While you need the proper tools to combine all of the pieces, you don't need a professional workshop, as many of them combine pre-made cabinets with on-site carpentry that ranges from simple to intermediate skill levels.

Some projects call for some fancy fabrication like the Country Diner (page 102) or the Club Bar. Others, like the Hobby Center (page 150), Laundry Center (page 128), and Window Seat (page 80) are tied together with unique site-built details that integrate the built-in into your space.

For a different mix of skills needed, check out the Trim Molding Shelves (page 214) and the Loft Bed (page 94). Each of these projects combines rough and finish carpentry to create two totally custom built-ins.

You'll also find super shelves, fun furniture, and spacious storage projects for kid's rooms, bathrooms, and utility spaces that can meet your needs today and grow with you and your family.

In the end, we hope that we've created a book that lives up to its name—not so much on these pages, but in your home and in your life.

If you aren't inspired to create that one-of-a-kind perfect-fit look for your house after flipping through the designs we've included in the Complete Guide to Shelves & Built-Ins, you are missing out on an opportunity for maximizing the "Wow" from your friends and family.

We hope you have as much fun building these projects as we did building this book.

Theresa Coleman

Portfolio of Built-In & Shelving Projects

Built-ins add character and charm to any space. While built-ins can be purely functional, they can also be decorative (as shown to the left) or combine functionality with a showcase element (as shown above). The type of built-in that works best for you and your home depends on your style and how you enjoy showing off prized treasures.

Built-ins are more than just simple shelves and wall cabinets. Whether you are building a cozy kitchen nook (left), an underbed platform (below) or a storage cabinet that custom-fits your bathroom floorplan (right), unique little extras like drawers and cubbies in one-of-a-kind built-in furniture can maximize storage options for every type of space.

Bookshelves are one of the most popular types of built-in projects. Bookshelves don't have to just be showcased prominently in a formal living room, they also fit perfectly—and dramatically maximize smaller homes' storage potential—along hallways (opposite page). Built-in storage also can act as a visual room divider in larger spaces, creating the opportunity to display keepsakes that can be viewed from both rooms, and giving homeowners additional nooks to stow other items away (left). Even the smallest, simplest of shelves can greatly increase the amount of usable space (below) and add visual impact.

Built-in projects aren't just for traditionalists. In the built-ins category you will find countless perfect projects and stock products that match the modern style of many of today's homes. A uniquely shaped room can benefit from a custom built-in couch that maximizes the space inside the frame. Drawers keep throw blankets handy for colder days, and games ready for guests. A kitchen with a view is a perfect spot to integrate an eating area without interrupting the floorplan or flow of the space. And for the home office, there are many cabinets that offer semi-stock accessories, from file drawers and CD organizers to pull-out writing trays and office supply organization trays (right).

The bathroom (opposite page) is a smaller space in most homes, and really benefits from some custom built-in organization. Optimizing the space with a built-in cabinet outfitted with upgraded organization accessories can help keep all of those little bottles and grooming supplies much more easily managed.

Sports equipment, shoes, and coats are typically among the top clutter culprits in most houses. By creating a coat cubby or locker-room-styled organization (below) near the most-used entryway, you'll create a greater chance that those items might be put away. For kids' rooms, take advantage of the whimsy of color and style when decorating custom built-ins, and take the opportunity to maximize the storage possibilities (left).

Awkward spaces, nooks and crannies don't offer much utility to the homeowner, but when improved with a clever built-in or shelving project, the space can become a real asset for your home. Understairs areas are prime examples of unused space that can be exploited with a built-in, as with this understairs wine rack (right).

If your idea of built-ins is simply cabinet installations in a kitchen or a bathroom, there are many styles, finishes, and colors available. Cabinet-makers are offering detailing options—moldings, wine racks, spice racks, and pull-out trays, for example—that help you create the exact look and performance you desire (below).

TECHNIQUES & DESIGN

Tools & Materials

Building shelves and built-ins is a challenging job that requires patience, attention to detail, and the right tool for each task. Without these basic requirements, you are setting yourself up for potential failure and the result will suffer.

Start off right by using high-quality tools. Good tools last longer and are generally more accurate than less expensive versions.

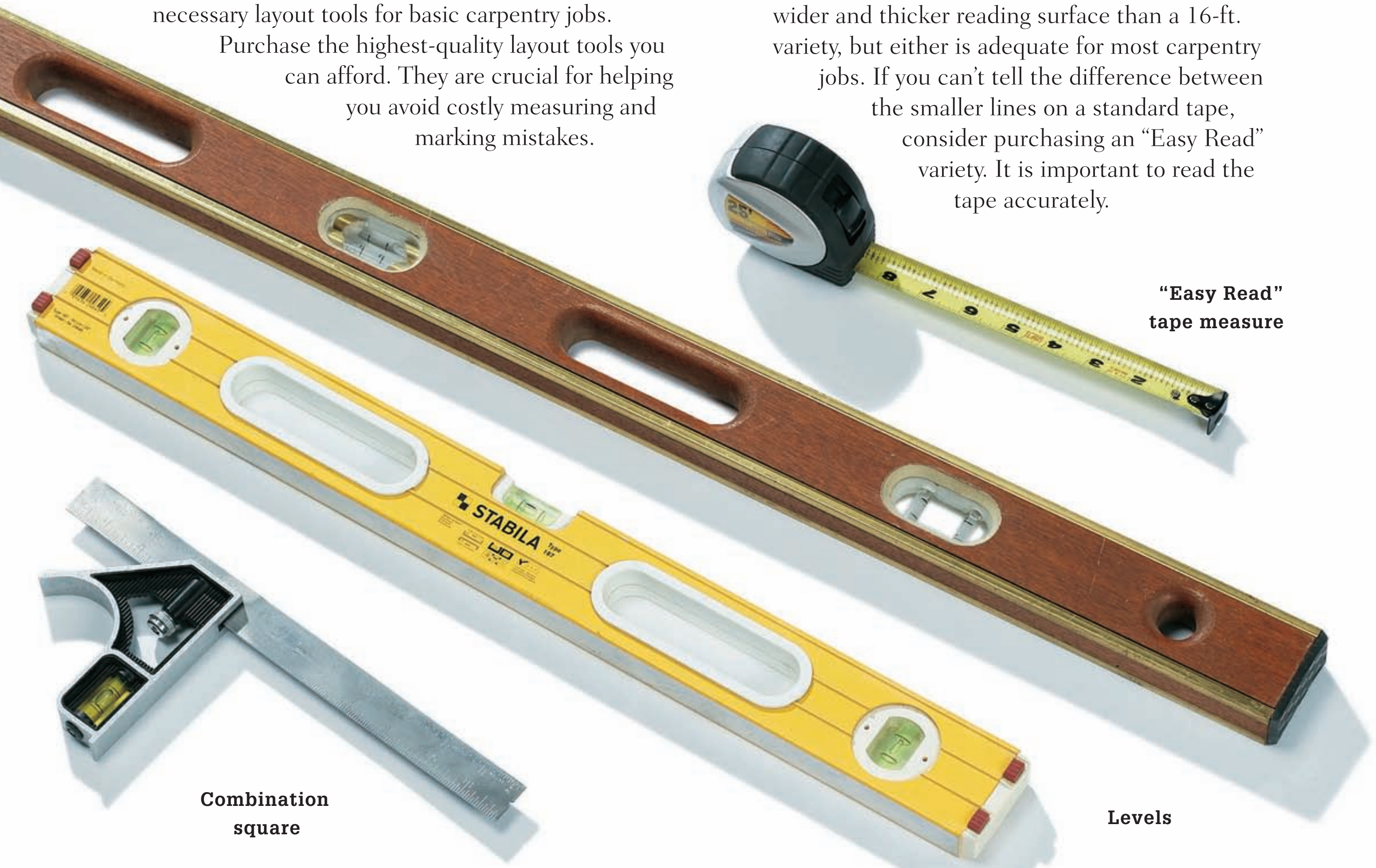
Many people buy tools only as they are needed to avoid purchases they will not use. This rationale should only apply to power tools and higher-priced specialty items. A high-quality basic tool set is important for every do-it-yourselfer to have on hand. Doing so avoids improper tool usage and makes your job easier, with improved results.

The hand tools you will need for most finish carpentry jobs can be broken down into two types: layout tools and construction tools. It is common for most people to own construction tools, but to lack necessary layout tools for basic carpentry jobs. Purchase the highest-quality layout tools you can afford. They are crucial for helping you avoid costly measuring and marking mistakes.

LAYOUT TOOLS

Layout tools help you measure, mark, and set-up perfect cuts with accuracy. Many layout tools are inexpensive and simply provide a means of measuring for level, square, and plumb lines. However, recent technologies have incorporated lasers into levels, stud finders, and tape measures, making them more accurate than ever before but, at a slightly higher price. Although these new tools are handy in specific applications, their higher price is not always warranted for the do-it-yourselfer.

- **A tape measure** is one of the most common tools around. The odds are good that you already own at least one. (If you are making frequent trips for building supplies, invest in a second tape that stays in your car.) Carpentry projects require a sturdy tape measure with a length greater than your longest stock. A 25-ft. tape measure has a wider and thicker reading surface than a 16-ft. variety, but either is adequate for most carpentry jobs. If you can't tell the difference between the smaller lines on a standard tape, consider purchasing an "Easy Read" variety. It is important to read the tape accurately.

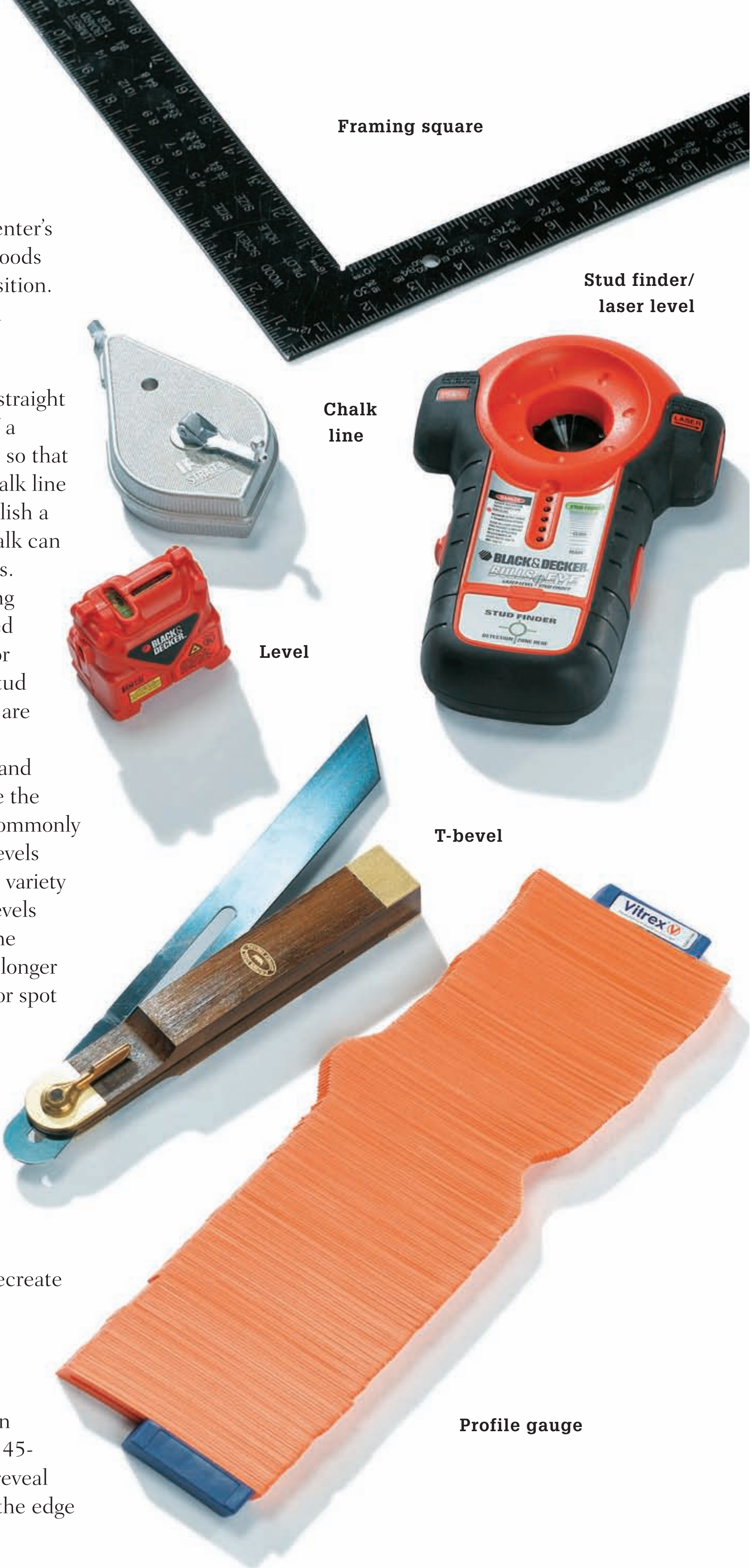


"Easy Read" tape measure

Levels

Combination square

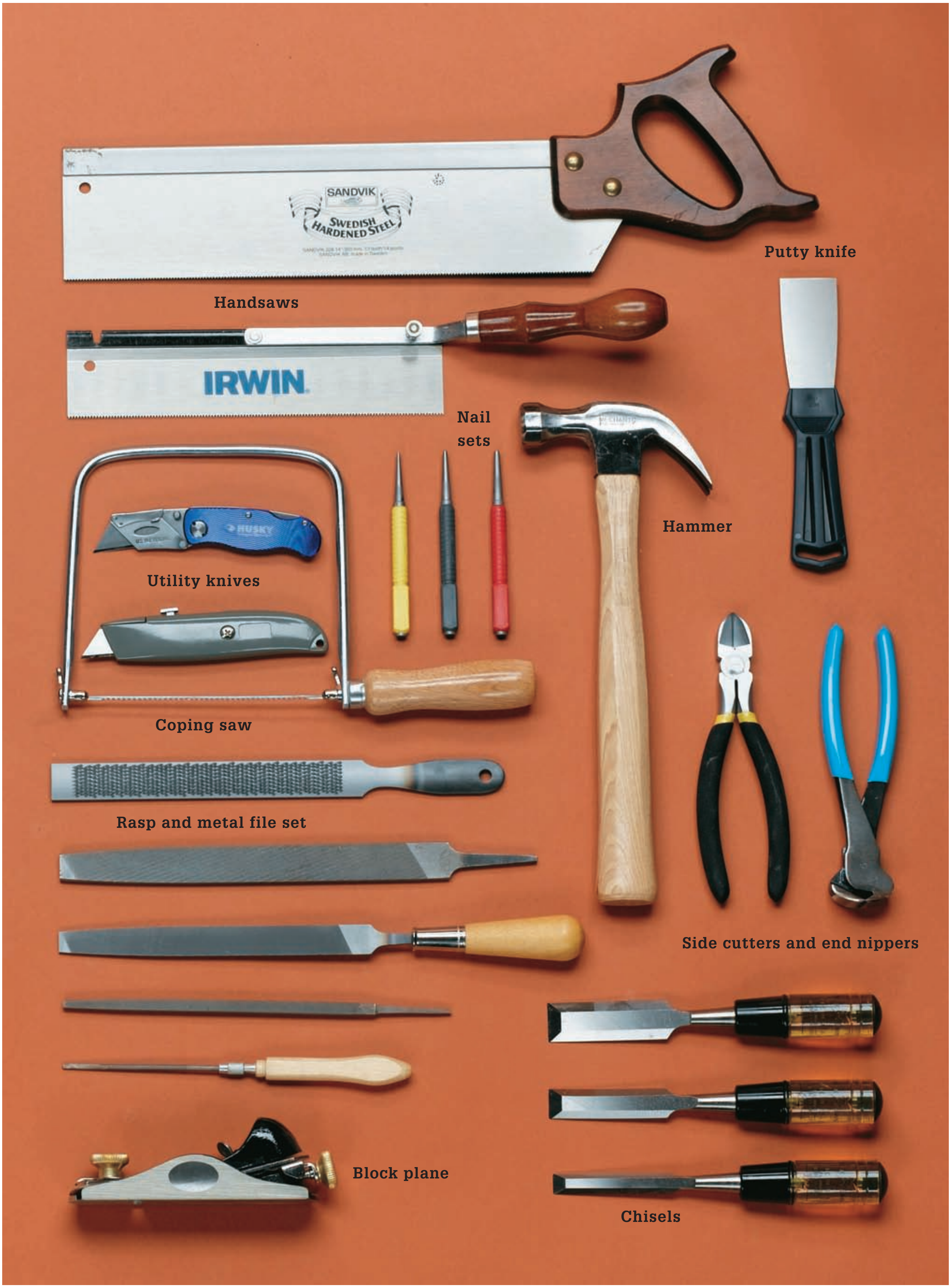
- **A framing square,** also known as a carpenter's square, is commonly used to mark sheet goods and check recently installed pieces for position. Framing squares are also used as an initial check for wall squareness and plumb in relation to a floor or ceiling.
- **Chalk lines** are used to make temporary straight lines anywhere one is needed. The case of a chalk line, or the "box," is teardrop shaped so that the tool doubles as a plumb bob. Use a chalk line to mark sheet goods for cutting or to establish a level line in a room. Keep in mind that chalk can be difficult to remove from porous surfaces.
- **A stud finder** is used to locate the framing members in a wall or ceiling. Higher-priced versions also locate plumbing, electrical, or other mechanicals in the wall. Although stud finders are not completely necessary, they are convenient for larger jobs.
- **Levels** are available in a variety of lengths and price ranges. The longer and more accurate the level, the higher the price. The two most commonly used sizes are 2-ft. and 4-ft. lengths. 2-ft. levels are handy for tighter spaces, while the 4-ft. variety serves as a better all-purpose level. Laser levels are handy for creating a level line around the perimeter of a room or for level lines along longer lengths. They provide a wide range of line or spot placement, depending on the model.
- **A T-bevel** is a specialized tool for finding and transferring precise angles. T-bevels are generally used in conjunction with a power miter saw to gauge angled miters of non-square corners. This tool is especially handy in older homes where the original states of square, plumb, and level may no longer apply.
- **A profile gauge** uses a series of pins to recreate the profile of any object so that you may transfer it to a work piece. Profile gauges are especially useful when dealing with irregular obstructions.
- **A combination square** is a multifunction square that provides an easy reference for 45- and 90-degree angles, as well as marking reveal lines or a constant specific distance from the edge of a work piece.

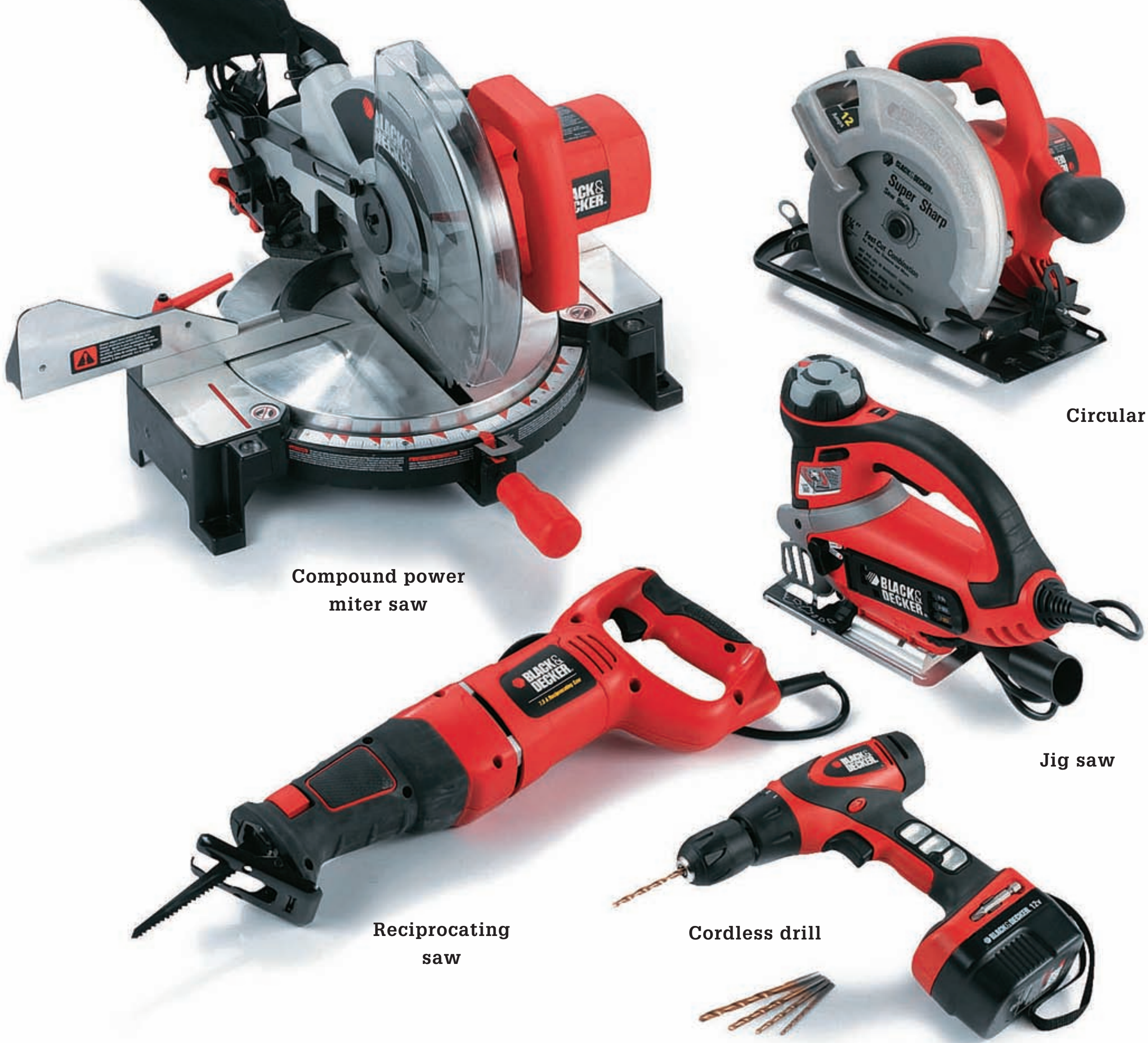


CONSTRUCTION TOOLS

- **A good quality hammer** is a must for every carpentry project. A 16-oz. curved claw hammer, otherwise known as a finish hammer, is a good all-purpose choice. Some people prefer a larger straight claw hammer for heavy tear-down projects and rough framing, but these hammers are too clumsy and heavy for driving smaller casing and finish nails, and tend to mar the surface of trim.
- **Utility knives** are available in fixed, retracting, and retractable blades. This tool is used for a wide variety of cutting tasks from pencil sharpening to back-beveling miter joints. Always have additional blades readily available. Folding fixed-blade utility knives offer the durability and strength of a fixed blade with the protection of a folding handle.
- **A set of chisels** is necessary for installing door hardware as well as notching trim around obstacles and final fitting of difficult pieces. Keep a set only for use with wood, and do not substitute them for screwdrivers.
- **Block planes** are used to fit doors into openings and remove fine amounts of material from trim. A finely tuned block plane can even be used to clean up a sloppy miter joint.
- **A coping saw** has a thin, flexible blade designed to cut curves and is essential for making professional trim joints on inside corners. Coping saw blades should be fine toothed, between 16 and 24 teeth per inch for most hardwoods, and set to cut on the pull stroke of the saw to offer you more blade control.
- **A sharp handsaw** is convenient for quick cut-offs and in some instances where power saws are difficult to control. Purchase a crosscut saw for general-purpose cutting.
- **Protective wear,** including safety glasses and ear protection, is required any time you are working with tools. Dust masks are necessary when sanding, doing demolition, or when working around fumes.
- **Pry bars** come in a variety of sizes and shapes. A quality forged high-carbon steel flat bar is the most common choice. Wrecking bars make lighter work of trim and door removal due to their added weight. No matter what type of pry bar you use, protect finished surfaces from scratches with a block of wood when removing trim.
- **Side cutters and end nippers** are useful for cutting off and pulling out bent nails. The added handle length and curved head of an end nippers makes them ideal for larger casing nails. Pneumatic brad nails and smaller pins will pull out easier with side cutters. Purchase a nail set for countersinking nail heads. Three-piece sets are available for different nail sizes.
- **A rasp and metal file set** is important for fitting coped joints precisely. The variety of shapes, sizes, and mills allow for faster rough removal of material, or smoother slow removal, depending on the file.
- **Use a putty knife** to fill nail holes with wood filler and for light scraping tasks.

Pry bars
Protective wear

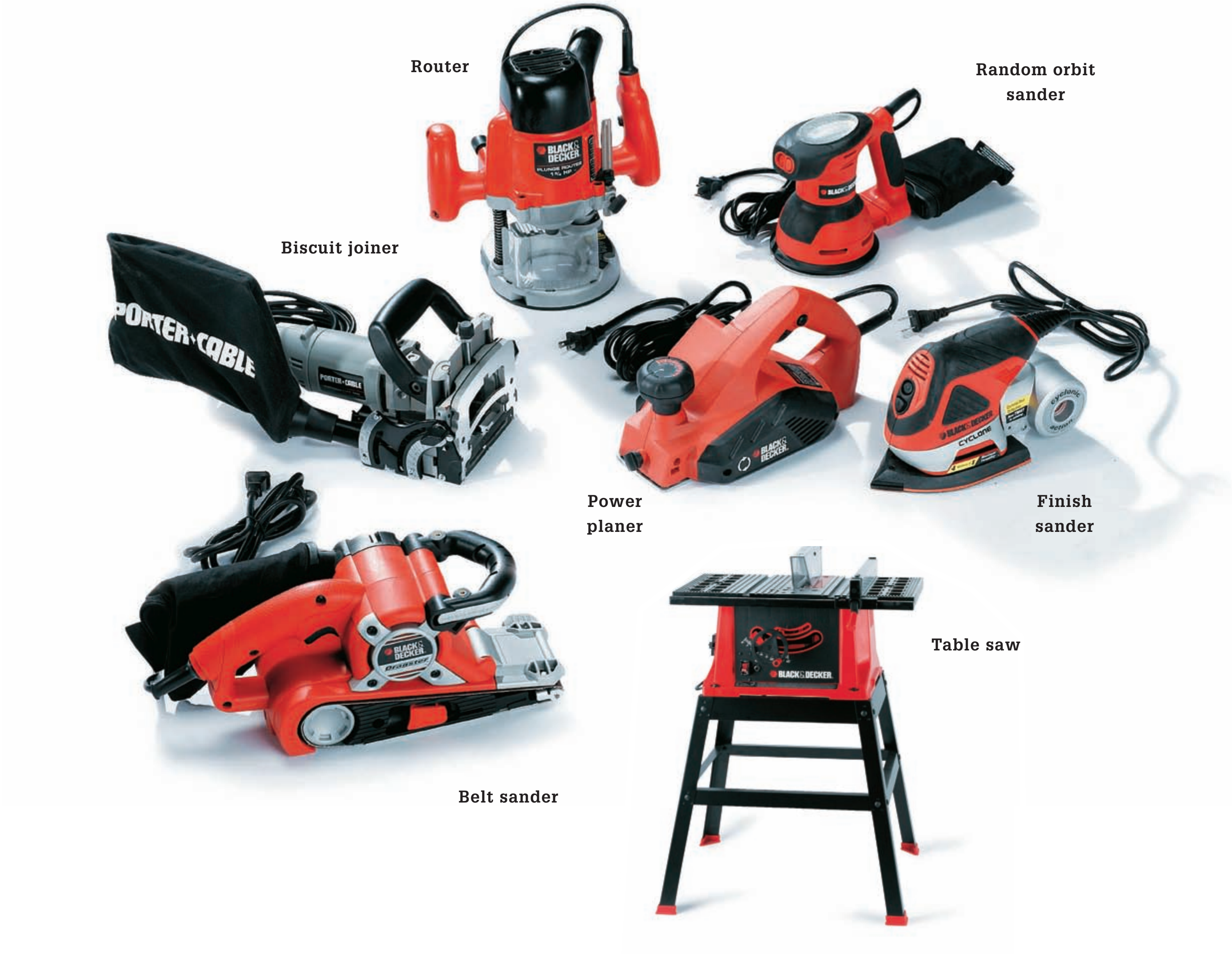

Putty knife
Handsaws
Nail sets
Hammer
Utility knives
Coping saw
Rasp and metal file set
Side cutters and end nippers
Block plane
Chisels



Power Tools

Despite the higher price as compared to hand tools, power tools are a great value. They allow you to work more quickly and accurately than with hand tools and make repetitive tasks like sanding, drilling, and sawing more enjoyable. Basic home carpentry does not require every power tool shown here, but some tools, such as a power miter box, are crucial for professional results. Purchase power tools on an as-needed basis, keeping in mind that while the cheapest tool is not always your best option, the most expensive and powerful is probably not necessary, either. Cheaper tools generally sacrifice precision, while the most expensive tools are made for people who use them every day, not just occasionally.

- **A cordless drill** is one of the handiest tools available. Although drills are not normally used to install trim, they make quick work of installing structural components. Occasionally, trim-head screws are used to install trim, rather than nails or regular wood screws.
- **A circular saw** is ideal for straight cuts in plywood and quick cut-offs of solid material. Purchase a plywood blade to make smooth cuts in plywood, and a general-purpose blade for other cuts.
- **A jig saw** is the perfect tool for cutting curves, or notching out trim around obstructions. Jig saw blades come in an array of designs for different styles of cuts and different types and thicknesses of materials. Always use the right type of blade and do not force the saw during the cut or it may bend or break.



- **A biscuit joiner** (also called a plate joiner) is a specialty tool used for alignment and to make strong joints between two square pieces of stock.
- **A reciprocating saw** is used for removal and tear-down applications. This tool is especially handy for removing door jambs.
- **A power miter saw, or chop saw,** will yield professional results. Most have a 10" or 12" diameter blade. A compound power miter saw has a head that pivots to cut both bevels and miters. Sliding miter saws have more cutting capacity but are less portable. A fine-tooth carbide-tipped blade is best for built-in and shelving projects.
- **A belt sander** is not essential but is a handy tool for quick removal of material.
- **Random-orbit sanders** are a good choice for smoothing flat areas, such as plywood, quickly. Random-orbit sanders leave no circular markings, like a disc sander, and can sand in any direction regardless of wood grain.
- **Finish sanders** are available in a variety of sizes and shapes for different light sanding applications.
- **A power planer** is used to trim doors to fit openings and flatten or straighten out materials. Power planers are faster to use than manual hand planes, but the results are more difficult to control.
- **A table saw** is the best tool for ripping stock to width, and larger models can be fitted with a molding head for cutting profiles.
- **A router** (plunge router is shown here) has many uses in trim carpentry, especially for cutting edge profiles to make your own custom workpieces.

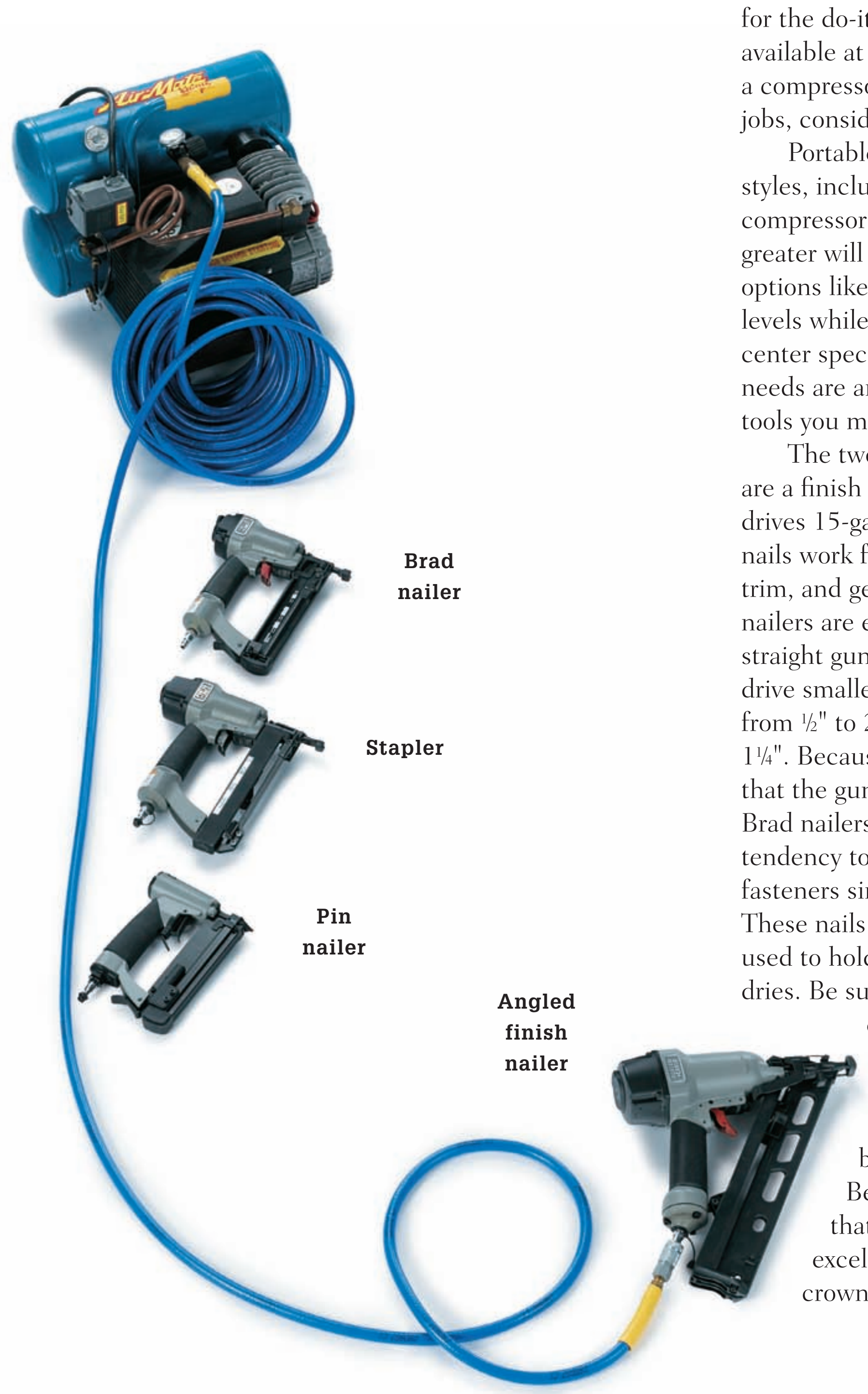
Pneumatic Tools

Pneumatic tools can be a key to timely, professional carpentry results. They save time and energy over traditional hammer-and-nail installation. Not only do they drive fasteners quickly, but they countersink at the same time, avoiding multiple strikes to trim, which could throw joints out of alignment. Predrilled holes are not necessary with pneumatic tools. Splitting is infrequent if the work piece is held firmly in place and the nails are positioned at least 1" from trim ends. Nail guns also allow you to concentrate on the placement of the work piece with one hand and fasten it with the other. You needn't fumble around with single fasteners because they are already loaded in the gun.

The costs of pneumatic tools, compressors, and fasteners has decreased over the years, making them not only the professional's choice, but a great option for the do-it-yourselfer as well. Pneumatic kits are available at home centers with two different guns and a compressor at a value price. For small or infrequent jobs, consider renting pneumatics.

Portable compressors are available in different styles, including pancake and hot-dog styles. Any compressor with air pressure capability of 90 psi or greater will drive a finish or brad nailer. Consider options like tank size, weight of the unit, and noise levels while the compressor is running. Talk to a home center specialist about what your specific compressor needs are and keep in mind any future pneumatic tools you might want.

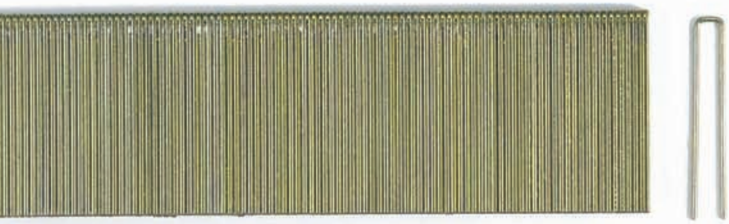
The two basic pneumatic tools used in carpentry are a finish nailer, and a brad nailer. A finish nailer drives 15-gauge nails ranging from 1" to 2½". These nails work for a variety of moldings, door and window trim, and general-purpose fastening. Angled finish nailers are easier to maneuver in tight corners than straight guns, but either option will work. Brad nailers drive smaller 18-gauge fasteners ranging in length from ½" to 2". Some brad nailers' maximum length is 1¼". Because the fasteners are smaller, it is no surprise that the gun is lighter and smaller than a finish gun. Brad nailers are used to attach thinner stock, with less tendency to split the wood. Headless pinners drive fasteners similar to brad nails, but without the head. These nails have less holding power, but are normally used to hold small moldings in place until the glue dries. Be sure to load headless pins with the points down, taking note of the label on the magazine. ⅜" crown staplers are used to attach thin panels and in situations where maximum holding power is needed, but the fastener head will not be visible. Because staples have two legs and a crown that connects them, their holding power is excellent. However, the hole left by the staple's crown is large and can be difficult to conceal.



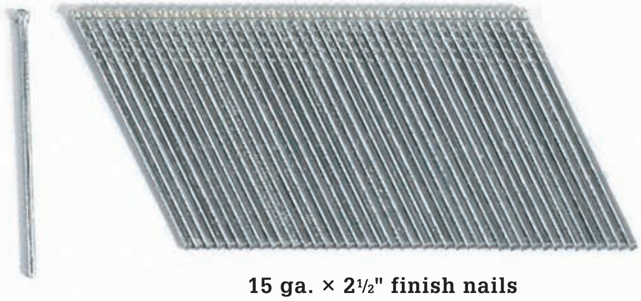
18 ga. × 1¼" brads

1¼" × ¾" narrow crown staples

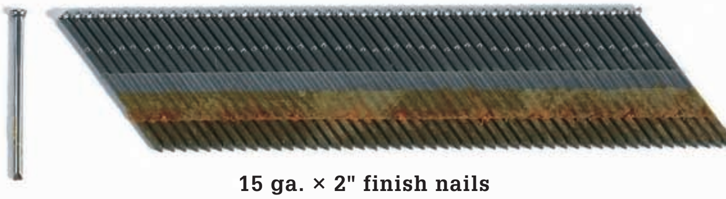
⅜" × 1" narrow crown staples



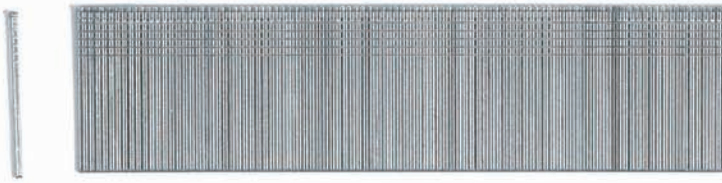
⅜" × 1½" narrow crown staples



15 ga. × 2½" finish nails



15 ga. × 2" finish nails



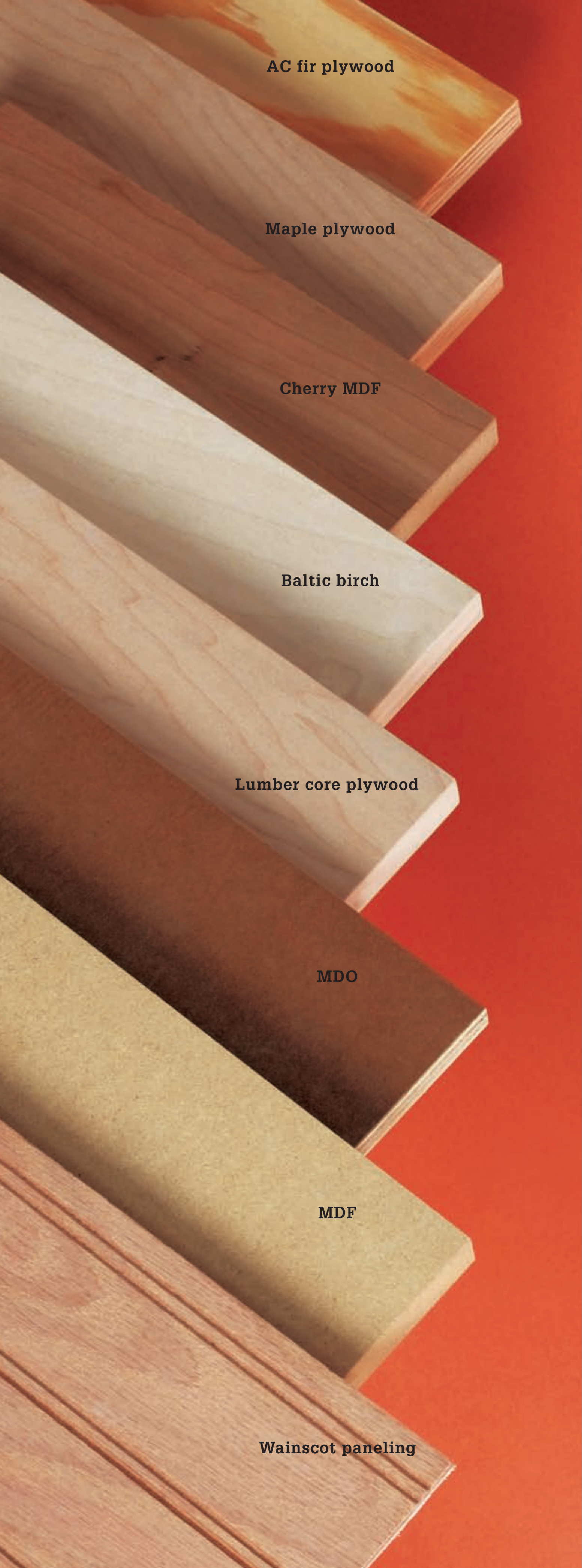
18 ga. × 1¼" brads

18 ga. × ⅝" brads

Pneumatic Fasteners

15-gauge angled finish nails and regular finish nails range in length up to 2½". The angled variety are exactly the same as the straight nails, but come in angled clips. These nails are made from galvanized wire, so they are suitable for exterior applications. Use finish nails to attach larger moldings and trim casings. Drive fasteners at regular intervals along the moldings and keep the position of the nails at least 1" from the molding ends. Fastener length is dependent upon the size of workpiece installed. Typical stock moldings and dimensional lumber is ¾" thick. When installing built-ins, the fastener must pass through the molding and wallboard and into the stud behind. Generally, half the fastener should be embedded in the backing or stud, so in most applications, 2" fasteners should suffice.

18-gauge brad nails range in length up to 2" for some guns and leave smaller holes to fill than finish guns. Brad nails are commonly used for thinner casings that are nailed directly to a solid backer. A specific example of this is along the inner edge of a door or window casing. The outer edge of the trim is nailed with a finish gun through the wallboard, while the inside edge rests against the door jamb, so it can be fastened with a brad nailer. Headless pins leave almost no nail hole to fill but are limited in length to 1". Their holding power is greatly diminished due to the lack of head, but they are generally used in conjunction with wood glue. ⅜" crown staples are used only when the fastener head will not be visible.



Sheet Goods

There are many different types of plywood for a wide array of uses. For built-in and shelf projects, finish-grade or paint-grade plywood is commonly used. Each type is made up of thinly sliced layers called plies. These layers are made of solid hardwood, softwood, or wood products. The more plies a sheet good has, the stronger it will be. This is only true for veneer-based plies. Medium density fiberboard, or MDF, is made of wood fibers that have been glued and pressed together. These panels are extremely stable and rarely shrink, expand, or warp. Plywood thicknesses range from ⅛" to 1". Many species of wood are available for the outer plywood veneers. Therefore, the core, or inner plies, give the panel its structural characteristics.

¾" or 23⁄32" AC plywood has a finish-grade face on one side and a utility grade on the other. Standard AC plywood is made of seven plies of softwood, such as spruce or pine. This plywood is a good choice for paint-grade moldings. ¾" hardwood veneer plywood is available in red oak, maple, and birch at most home centers. Its inner core is basically the same as AC plywood, but it has a hardwood outer face. ¾" MDF oak veneer plywood is made up of three layers: two outer oak veneers and a solid core made of MDF. This plywood tends to be less expensive than a veneer core product and has a smoother face, but is heavy, less durable, and does not hold fasteners as well.

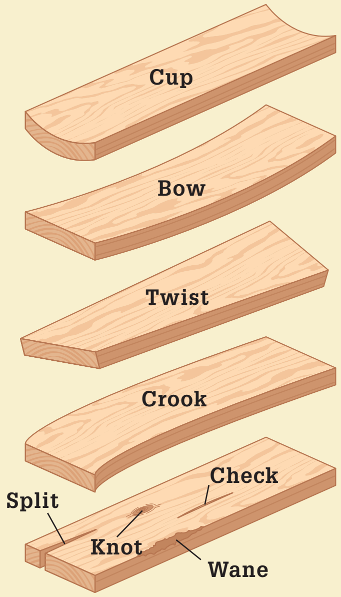
MDF is available with or without an outer veneer. ¾" Baltic birch plywood is made up of thirteen plies, making it more dimensionally stable than regular veneer core plywood. This panel is commonly used in Modern-style trim and can be painted or stained. Lumber-core plywood has strips of solid wood edge-glued between outer veneer plies. Medium density overlay, or MDO, plywood has a solid wood veneer core with an MDF face. This panel eliminates the weight of a MDF panel and has the fastening strength of a solid veneer core. The MDF face is perfect for paint-grade applications. Wainscoting paneling is available in several thicknesses from 3⁄16" to ⅝".

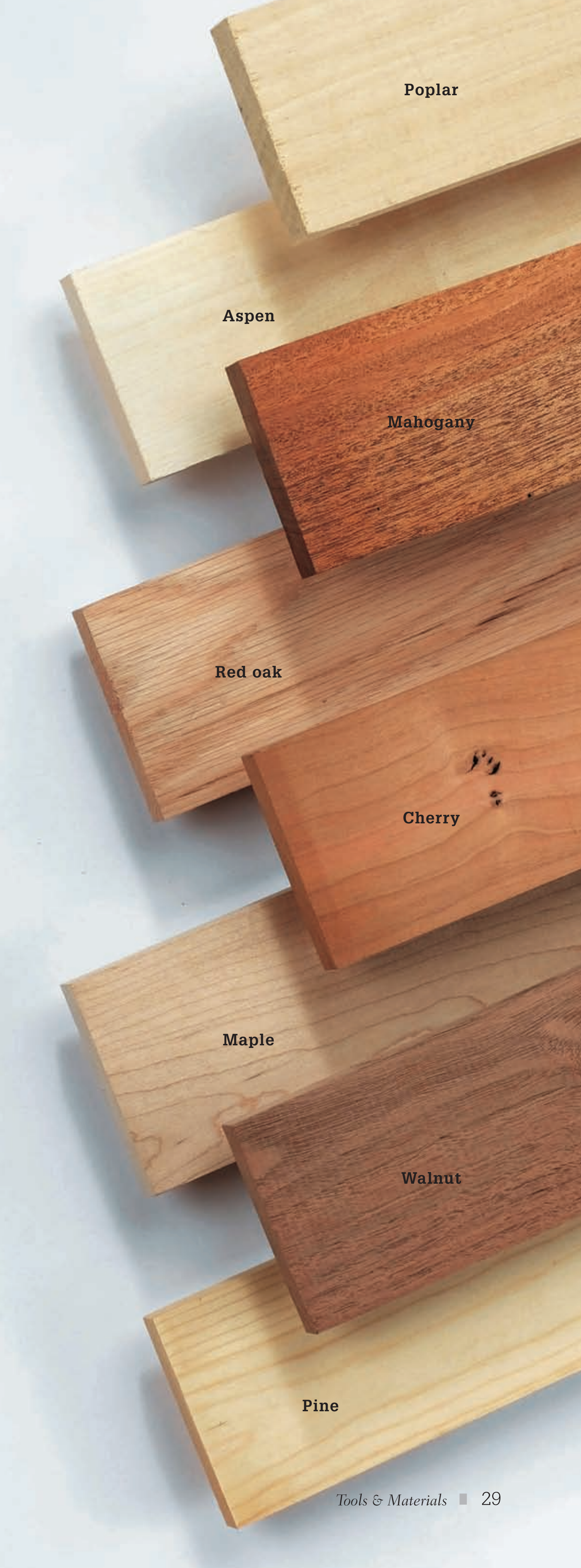
Lumber

Solid hardwood is available at most home centers in varying widths. Species vary, depending on your location. These boards make good solid stock material to combine with or mill into new trim moldings because they are already planed to a uniform thickness. If you can't find the type of lumber you need at a home center, check with a lumberyard or a small cabinet shop in your area. For larger runs with a uniform thickness, many cabinet shops will charge a nominal flat fee to plane the boards for you. They may even be willing to order the material for you through a local distributor.

Tip ▸

Whenever possible, do a quick inspection of each board before you purchase it. Because hardwood lumber is often stained, carefully take note of cosmetic flaws such as splits, knots, checks, and wanes. These issues can sometimes be cut around, but once the finish is applied, the imperfection will show through. Lumber that is twisted, cupped, or crooked should not be used at full length. If a board is slightly bowed, you can probably flatten it out as you nail it. In any case, always choose the straightest, flattest lumber you can find.





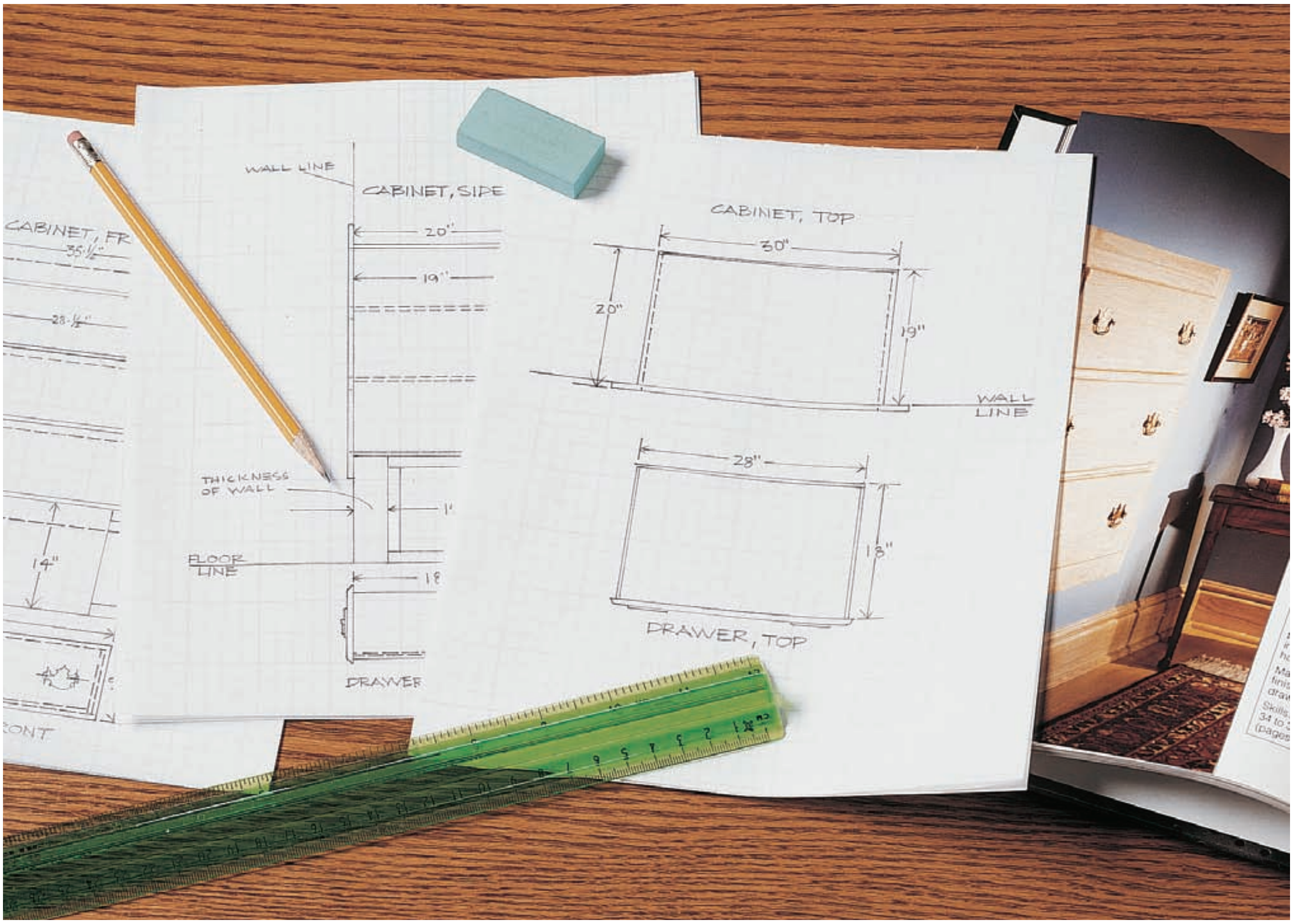
Planning a Project

With any of the built-in and shelf projects found in this book, you can either build the project as shown, or adapt the design to fit your unique space and needs. To build the project as shown, follow the measurements in the parts table that accompanies each project. Small width and height adjustments can be made using the fitting tips on page 32.

When adapting a built-in design, it is very important to make accurate plan drawings on graph paper to show how the project will fit in your space. These drawings let you organize your work and find approximate measurements for parts; they also make it easier to estimate the cost of materials.

To ensure a professional look and functional use, plan your built-ins so they fall within the standard range of sizes used by cabinet makers and furniture manufacturers (page opposite.)

Whether you are adapting a project or following a design as shown, it is safer to measure and cut the pieces as you assemble the built-in in its location, rather than to precut all pieces in advance. Small discrepancies in marking, cutting, and assembly techniques can lead to costly errors if you precut all the pieces.



Make accurate scaled drawings on graph paper when adapting one of the built-in projects featured in this book. Use a simple scale, like 1 square = 1", to draw a side, top, and one or more front views of your project. For a complicated project, draw several front views showing the basic walls (carcase) of the built-in, the face frame construction, and the finished project including drawers and doors. Side views and top views should show all trim pieces and moldings. Make sure to use the actual measurements of sheet goods and dimension lumber when making your drawings.

STANDARD BUILT-IN MEASUREMENTS

Highest shelf should be no more than 80" above the floor to be within easy reach.

Shelves should be at least 10" deep in bookcases, and 12" deep in hanging wall cabinets. Space the shelves so there is at least ½" of open space above the items you are storing.

First shelf in a wall-hung built-in should be at least 18" above a countertop.

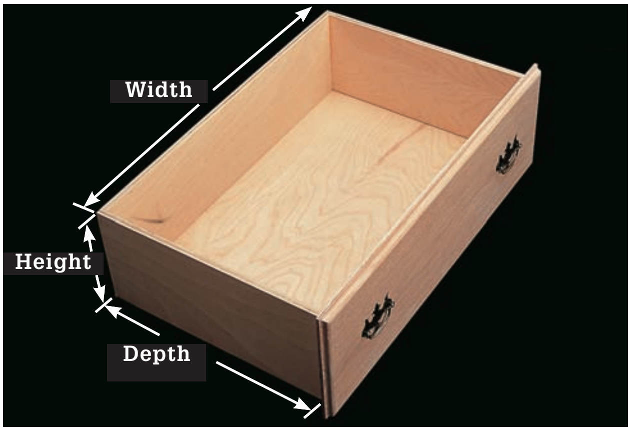
Work-surface height varies depending on how the surface is used. Place the surface 28" to 30" above the floor for a typing desk or sewing work center. Place the countertop at 36" for standard kitchen cabinets, at 44" for a dry bar or eating counter, or at 34" for accessible rooms.

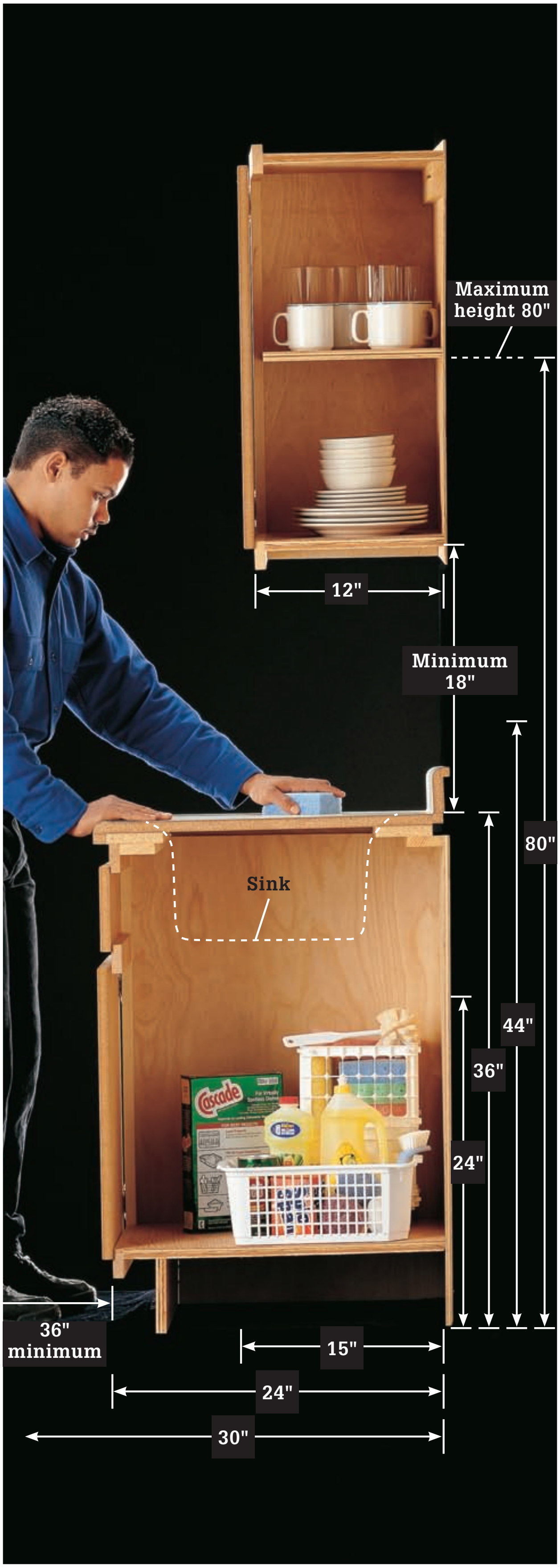
Standard seating surfaces, like window seats and desk chairs, are between 16" and 20" high.

Base cabinet depth varies from 15" for a room divider to 30" for cabinets that support a desk surface. Standard kitchen-style floor cabinets usually are 24" or 25" in depth.

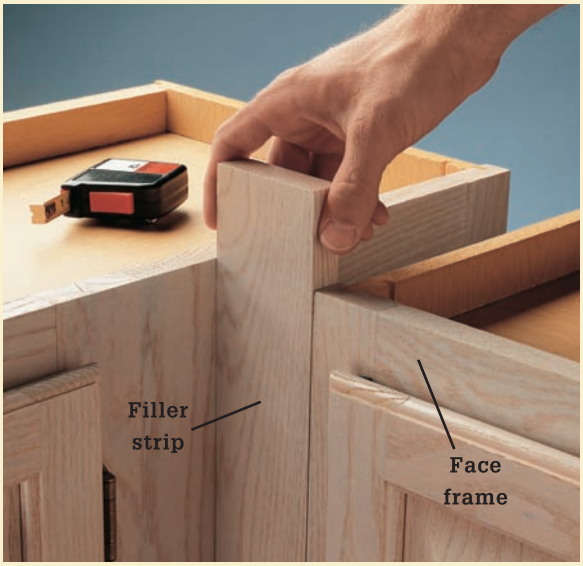
Access space in front of a built-in should be at least 36" to provide kneeling space for opening drawers and cabinet doors.

Drawer sizes range from a minimum of 3" high, 8" wide, and 8" deep; to a maximum of 10" high, 36" wide, and 30" deep. Large drawers, more than 24" wide, should be equipped with two drawer slides for stability.

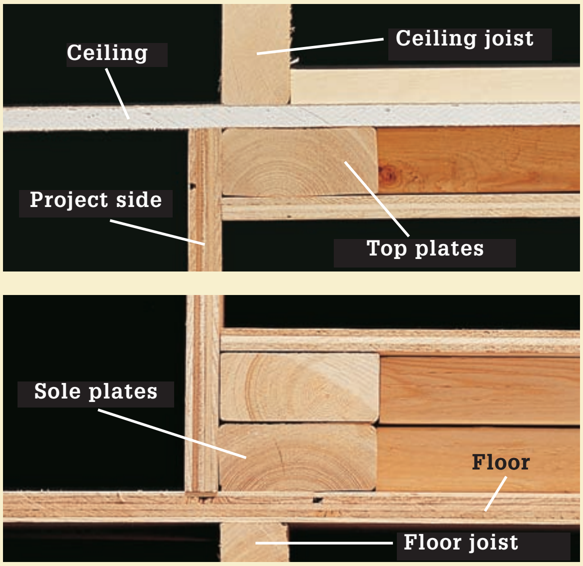




Tips for Planning and Fitting Built-Ins ▸



Make small width adjustments (up to 6" on each side) with hardwood strips measured and cut to fill the extra space. Attach the strips to the edges of the face frame with counterbored wood screws. These "filler strips" let you slightly enlarge a project without making changes to the basic design. Filler strips also can be scribed to fit uneven walls.



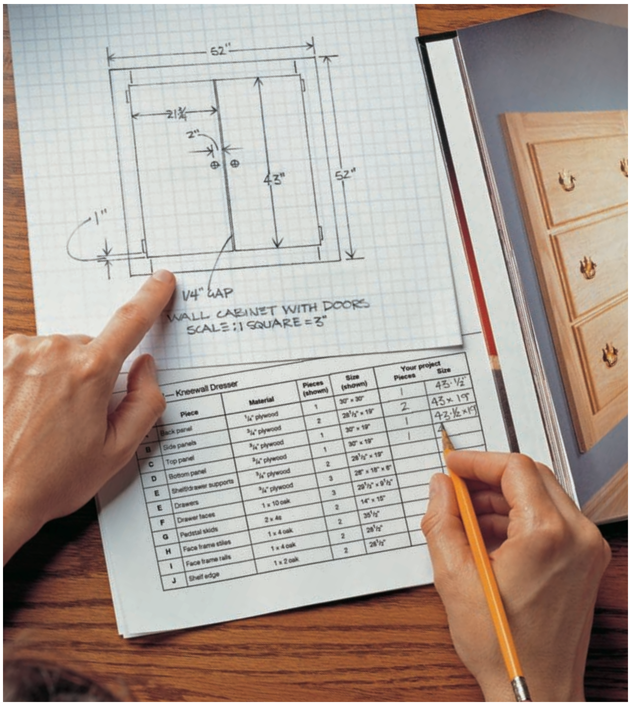
Make small height adjustments by changing the thickness of the sole plates or top plates that anchor the built-in to the floor and ceiling. The floor-to-ceiling projects in this book are designed to fit rooms with 8-ft. ceilings. If your room height differs slightly, adjusting the sole plates or top plates lets you adapt a project without major design changes.

Measure spaces carefully. Floors, walls, and ceilings are not always level or plumb, so measure at several points. If measurements vary from point-to-point, use the shortest measurement to determine the height or width of your built-in.

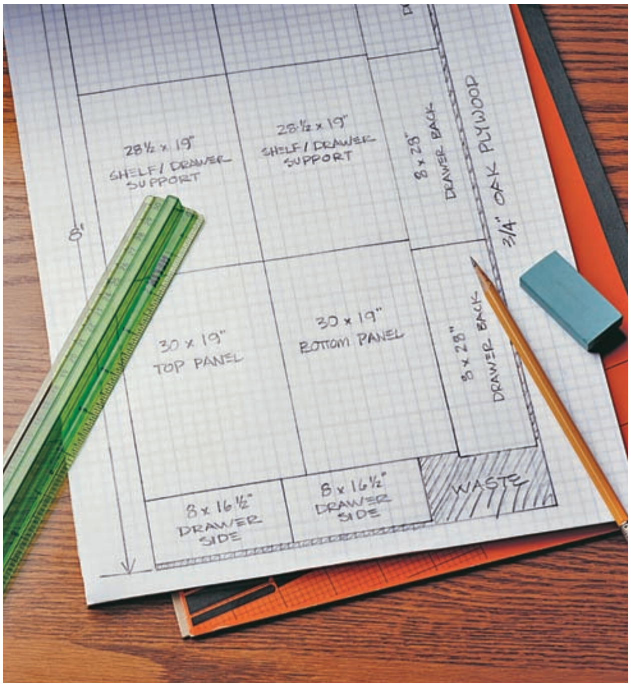
Measure your materials. Actual thickness for plywood can vary from the listed nominal size; ¾" plywood, for example, can vary in thickness by nearly ⅛".

Nominal size	Actual size
1 × 2	¾" × 1½"
1 × 3	¾" × 2½"
1 × 4	¾" × 3½"
1 × 6	¾" × 5½"
1 × 8	¾" × 7¼"
2 × 4	1½" × 3½"
2 × 6	1½" × 5½"
2 × 8	1½" × 7¼"
2 × 10	1½" × 9¼"

Use actual measurements, not nominal measurements, of dimension lumber when planning a built-in. The table above shows the actual dimensions of common lumber.


52"
21½"
2"
43"
52"
1"
1/4" GAP
WALL CABINET WITH DOORS
SCALE: 1 SQUARE = 3"
Kneewall Dresser

Revise the listed measurements of a featured project, if necessary, and record them. Use your scaled drawings as a guide for estimating the revised measurements. Always double-check measurements before cutting pieces to prevent costly cutting errors.


28½ x 19" SHELF/DRAWER SUPPORT
28½ x 19" SHELF/DRAWER SUPPORT
8 x 28" DRAWER BACK
3/4" OAK PLYWOOD
8'
30 x 19" TOP PANEL
30 x 19" BOTTOM PANEL
8 x 28" DRAWER BACK
8 x 16½" DRAWER SIDE
8 x 16½" DRAWER SIDE
WASTE

Make cutting diagrams to help you make efficient use of materials. Make scale drawings of sheet goods on graph paper, and sketch cutting lines for each part of your project. When laying out cutting lines, remember that the cutting path (kerf) of a saw blade usually consumes 1/8" of wood.

Materials	Amount needed	Cost for each	Total cost
Plywood (4 ft. x 8 ft.)			
1/4" sheets			
1/2" sheets			
3/4" sheets			
Lumber			
1 × 2 boards			
1 × 3 boards			
1 × 4 boards			
1 × 6 boards			
1 × 8 boards			
2 × 4s			
Moldings			
Door-edge			
Shelf-edge			
Base shoe			
Baseboard			
Crown/cove			
Ornamental			
Hardware			
Finish nails			
Power-drive screws			
Angle brackets			
Countertop brackets			
Drawer slides			
Hinges			
Door latches			
Pulls/knobs			
Other materials			
Wood glue			
Oil/stain			
Sanding sealer			
Paint			
Outlet strips			
Grommets			
Light fixtures			

Total cost:

Make a list of materials, using your plan drawings and cutting diagrams as a guide. Photocopy this materials list, and use it to organize your work and estimate costs.

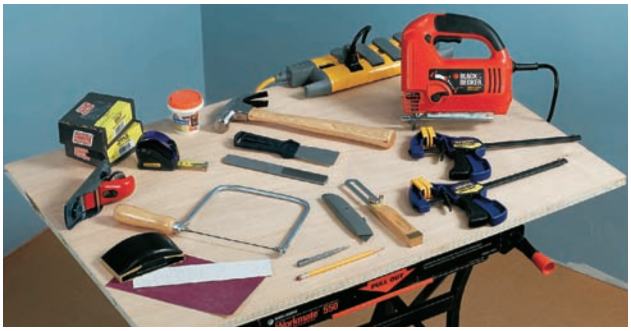
Jobsite Preparation

Whether you are installing an elaborate, custom built-in or a simple shelf, preparing the jobsite is an important step of your project. Remove furniture and other objects from the rooms you will be working in so that you won't worry about getting sawdust on a nice upholstered chair, or accidentally damaging an antique furnishing. Cover any items you cannot remove with plastic sheeting. You may also want to cover finished floors with cardboard or plastic as well, to protect them from scratches or just to make clean-up easier.

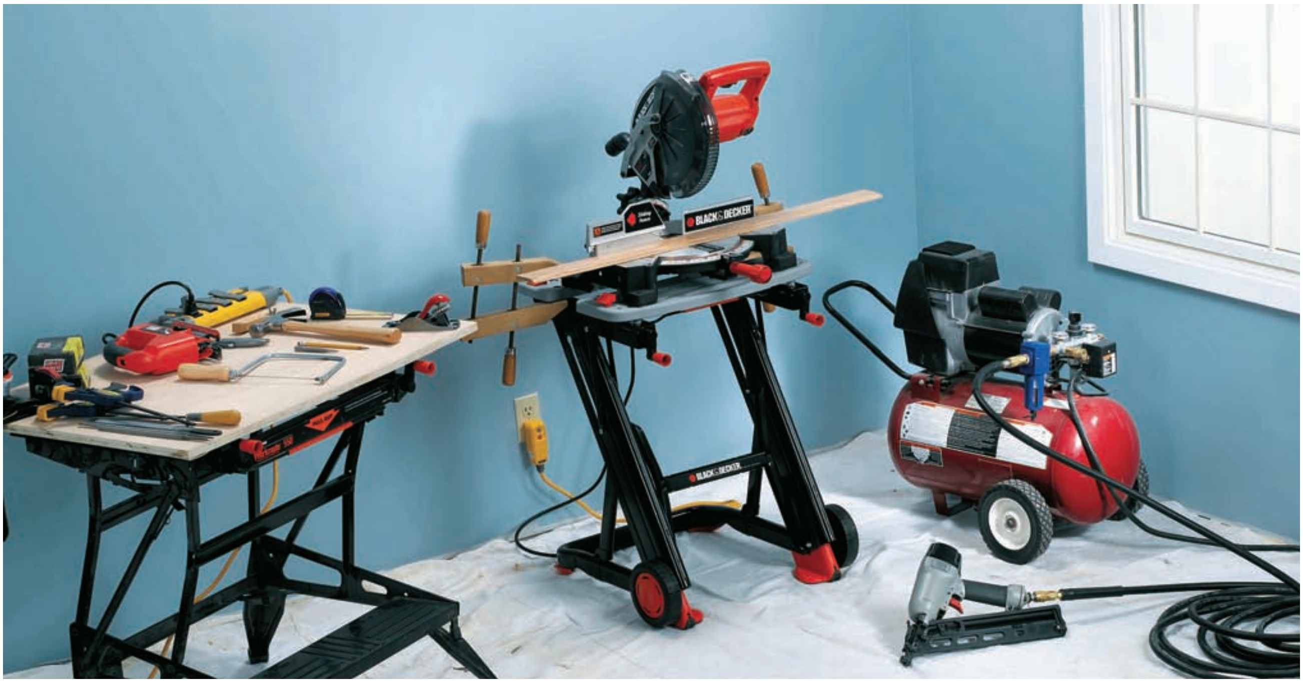
Set up tools such as a power miter saw at a central workstation, to avoid walking long distances between where you are installing and where you are cutting material. This central location is key to professional results because measurements are easier to remember and quick trimming is possible without the added time of exiting and entering the house.

Make sure the work area is well lit. If you don't already own one, purchase a portable light (trouble light) to make viewing the workpieces easier. Keep your tools sharp and clean. Accidents are more likely when blades are dull and tools are covered in dust and dirt.

Keep the work area clean and organized. A dedicated tool table for staging your tools is a great organizational aid. Tool tables also make it possible to conveniently keep tools from disappearing. If you only use the tools that you need and set them on the tool table when you aren't using them, tools stay off the floor and out of other rooms. Add a set of clamps to the table and you have a convenient space for fine-tuning the fit of each piece.



Organize your tools and avoid wearing a bulky work belt by setting up a dedicated tool table where all of your project tools and materials can be staged.



In some built-in or shelving projects, the most efficient way to accomplish the work is to convert the installation room into a temporary workshop.

Project Safety

Personal safety should be a priority when working on any project. Power tools and hand tools can cause serious injuries that require immediate attention. Be prepared for such situations with a properly stocked first aid kit. Equip your kit with a variety of bandage sizes and other necessary items such as antiseptic wipes, cotton swabs, tweezers, sterile gauze, and a first aid handbook.

To help you avoid using the first aid kit, read the owner's manuals of all power tools before operating them, and follow all outlined precautions. Protect yourself with safety glasses, ear protection, and dust masks and respirators when necessary.

Keep your work environment clean and free of clutter. Clean your tools and put them away after each work session, sweep up dust and any leftover fasteners, and collect scraps of cut-off trim in a work bucket. These scraps may come in handy before the end of the project, so keep them around until you are finished.

Maintain safety throughout your project, and remember that being safe is a priority. Everyone needs to use ear protection when operating loud tools. If you don't, you will lose your hearing. People don't just get used to loud noise. They lose their hearing and the noise doesn't seem as loud. The concept that safety applies to everyone but you is foolish. Take the necessary precautions to prevent injury to yourself and those around you.

FIRST AID
Workmate 550
PULL OUT

Always wear safety glasses and ear protection when operating power tools. Use dust masks when necessary, and protect yourself from chemicals with a respirator. Work gloves save your hands when moving or handling large amounts of material. Knee pads are useful when working on floor-level projects such as baseboard.

BLACK & DECKER
INSTRUCTION MANUAL
NO. 7615
1½ HP ROUTER
Plunge Cut

Read the owner's manual before operating any power tool. Your tools may differ in many ways from those described in this book, so it's best to familiarize yourself with the features and capabilities of the tools you own. Always wear eye and ear protection when operating a power tool. Wear a dust mask when the project will produce dust.

Cutting & Fitting Joints

Cutting and fitting joints is a skill that requires patience, knowledge, and well-maintained equipment to achieve effective results. There are a few basic joints that are generally used for most carpentry applications: butt, inside and outside miter, scarf, and coped joints.

Although cutting joints accurately is the key function of a power miter saw, it is not the only tool necessary for quality joinery. Coped joints require a coping saw as well as a set of metal files. For some applications, fitting butt joints is simplified with the use of a biscuit jointer or a pocket hole jig. These are specialty tools designed for joining wood.

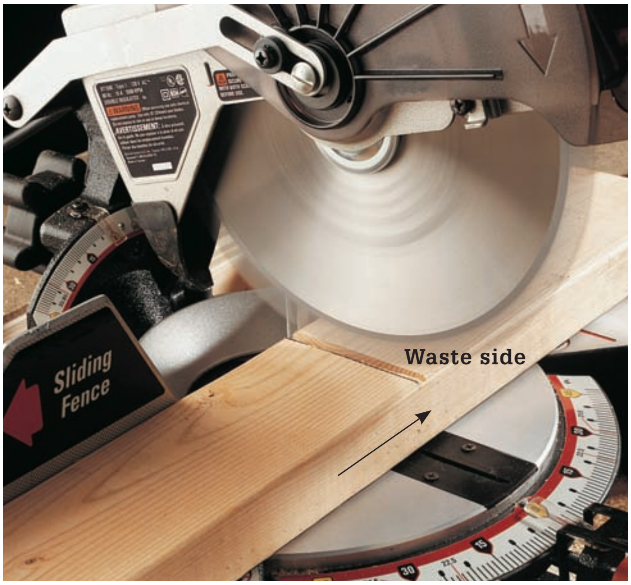
Cutting and fitting joints during installation can be very frustrating, especially when it involves difficult walls that are not plumb and corners that are out of square. Take the time to read through the proper techniques of using a miter saw, as well as the correct method for cutting each individual joint. These techniques are described in detail to help you work through the imperfections found in every house and to avoid common problems during installation.

BLACK & DECKER
BLACK & DECKER
IRWIN

Careful cutting is the hallmark of good joinery, be it in making furniture or installing trim moldings. Used correctly, a power miter saw offers the speed and precision to make your project look like it was done by a pro.

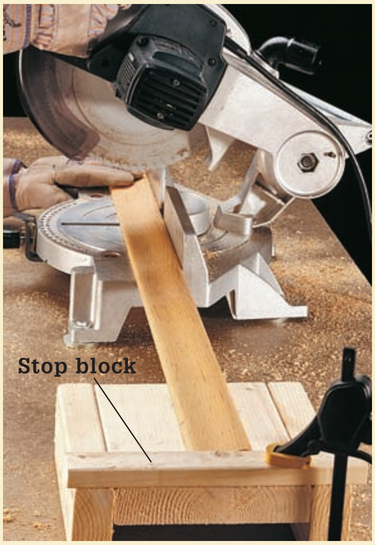
Power Miter Saw Techniques

There are two main types of power miter saws. The basic style cuts mitered angles when material is placed against the fence or beveled angles when material is placed flat on the work surface. The second type is called a compound miter saw. Compound saws allow you to cut a miter and a bevel simultaneously. The compound angle is extremely helpful in situations where a corner is out of plumb and a mitered angle requires a bevel to compensate. Some compound saws are available with a sliding feature that allows you to cut through wider stock with a smaller blade size. This option raises the cost of the saw considerably.



Tip: To avoid cutting off too much, start out by making a cut about 1/4" to the waste side of the cutting line, then nibble at the workpiece with one or more additional cuts until you have cut up to the cutting line. Wait until the blade stops before raising the arm on every cut.

Tips for Cutting with a Power Miter Saw ▸



To cut multiple pieces of stock to the same length, clamp a stop block to your support table at the desired distance from the blade. After cutting the first piece, position each additional length against the stop block and the fence to cut pieces of equal length.

Professional
Blade guard removed for clarity

Make a full downward cut with a compound saw to cut wide stock. Release the trigger and let the blade come to a full stop, then raise the saw arm. Flip the workpiece over and finish the cut.

Use a sliding miter saw equipped with a saw carriage that slides away from the fence. These saws have greater cutting capacity than a nonsliding saw so they can cut wider stock. They're also more expensive, but you may find it worth renting one.

Mitering Outside Corners

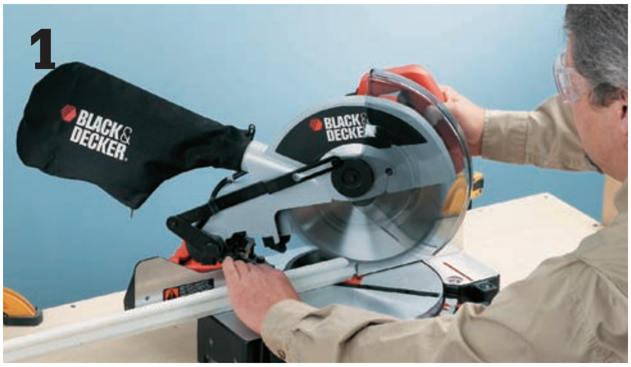
Cutting outside miters is one of the main functions of a power miter saw. Most saws have positive stops (called detents) at 45° in each direction, so standard outside corners are practically cut for you by the saw. Keep in mind that your saw must be accurately set up to cut joints squarely. Read the owner's manual for setting up your saw as well as for safety precautions. Before you begin, check the walls for square with a combination square or a framing square. If the corner is very close to square, proceed with the square corner installation. If the corner is badly out of square, follow the "Out of Square" procedure on the following page.

Tools & Materials ▸

- Combination square or framing square
- Miter saw
- Pencil
- Tape measure
- Pneumatic finish nail gun
- Air compressor
- Air hose
- T-bevel
- Molding
- Masking tape
- 1 × 4

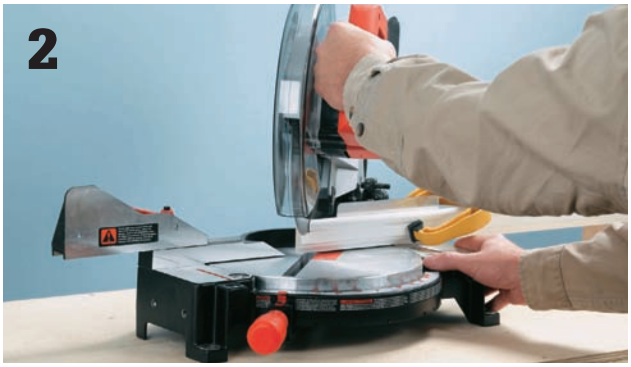
How To Miter Square Outside Corners

1



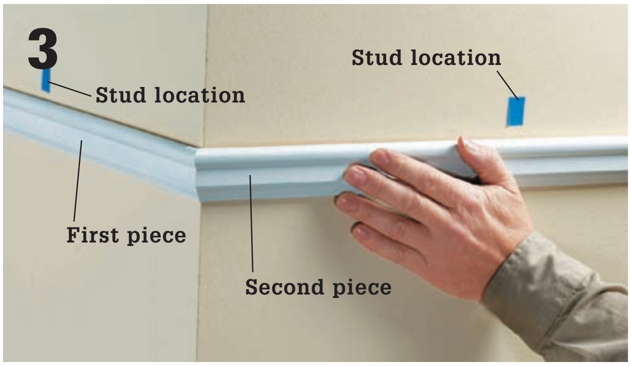
Set the miter saw to 45°. Position the first piece on-edge, flat on the miter box table, flush against the fence. Hold the piece firmly in place with your left hand and cut the trim with a slow, steady motion. Release the power button of the saw and remove the molding after the blade stops.

2



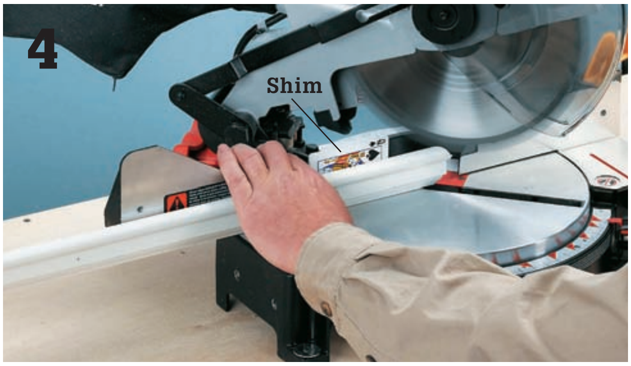
Set the miter saw blade to the opposing 45° positive stop. Place the second piece of molding on-edge, flat on the saw table, flush against the fence. Fasten the piece tightly in place with a hold-down or clamp. Cut the molding with a slow, steady motion.

3



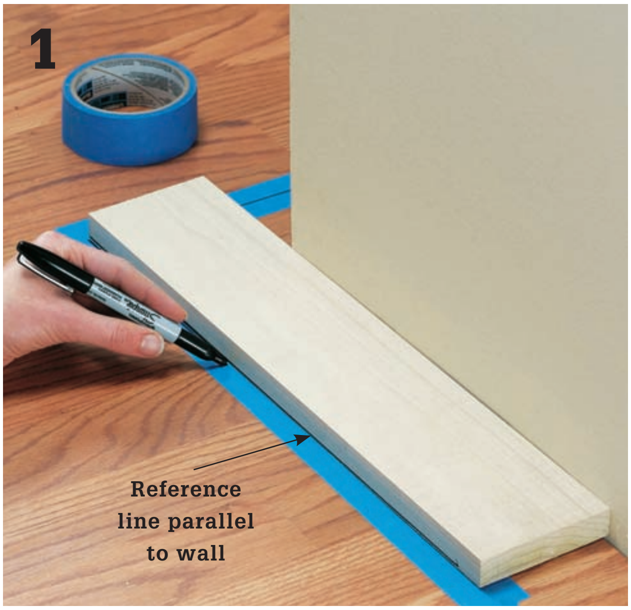
With the first piece of molding tacked in place, hold the second piece in position and check the fit of the joint. If the joint is tight, nail both pieces at stud locations.

4

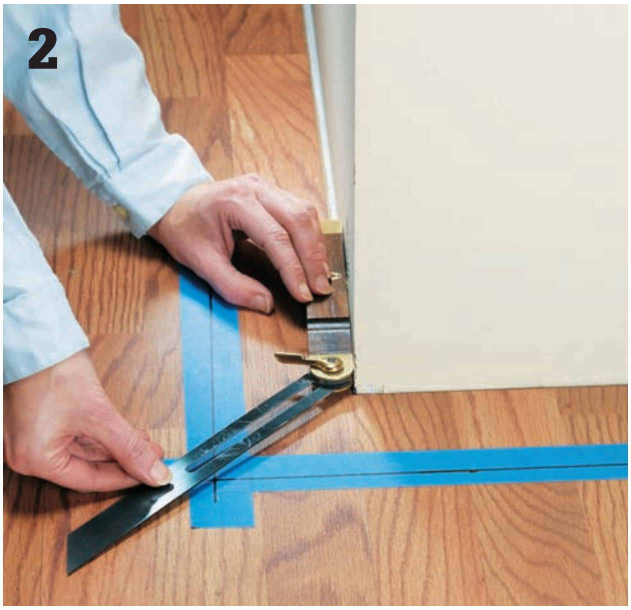


If the corner joint does not fit tightly, shim the work piece away from the fence to make minor adjustments until the joint fits tightly. Shims should be a uniform thickness. Playing cards work well.

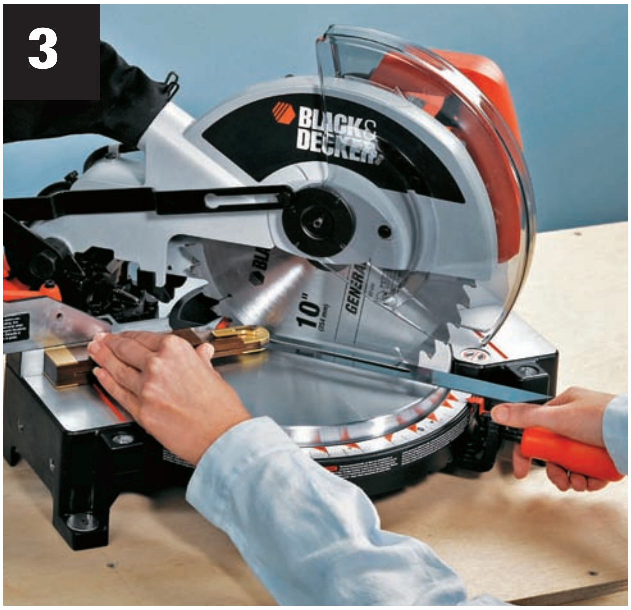
How to Miter Out-of-Square Outside Corners



Draw a reference line off each wall of the corner using a straight 1 × 4. Put masking tape down on the finished floor to avoid scuffing it and to see your lines clearly. Trace along each wall, connecting the traced lines at a point out from the tip of the corner.



To find the angle you need to miter your moldings, place a T-bevel with the handle flush against one wall, and adjust the blade so that it intersects the point where your reference lines meet. Lock the blade in place at this angle.



Transfer the angle of the T-bevel to the miter saw by locking the saw in the down position and adjusting the angle to match the angle of the T-bevel.

Position the molding on-edge, flat on the saw table and flush against the fence. Cut at your cutting mark. Tack the workpiece in place and repeat steps 2 through 4 to measure and cut the mating piece. Or, you can subtract the angle of the first cut (for example, 47°) from 90° to find the angle for the second cut (43° in this case). Using math is faster; taking direct measurements is more reliable.

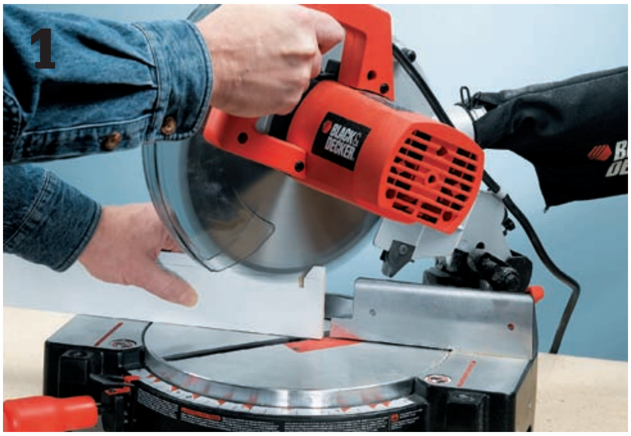
Mitering Inside Corners

Although most professionals prefer to cope-cut inside corners, it is common to see moldings that are mitered to inside corners. These joints are more likely to separate over time and to allow gaps to show. For that reason it is not advised to use inside corner miters when installing a stain-grade trim product. The gaps will be visible and are very difficult to fill with putty. For paint-grade projects, mitering inside corners makes more sense because joints can be filled and sanded before the top coats of paint are applied.

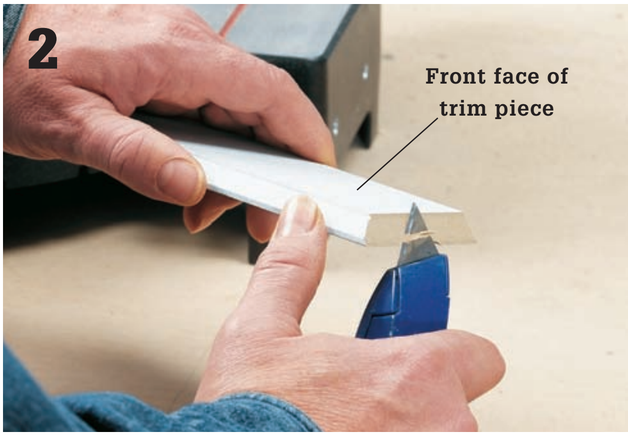
Tools & Materials ▸

- Miter saw
- Pencil
- Tape measure
- Utility knife
- Pneumatic finish nail gun
- Air compressor
- Air hose
- Molding

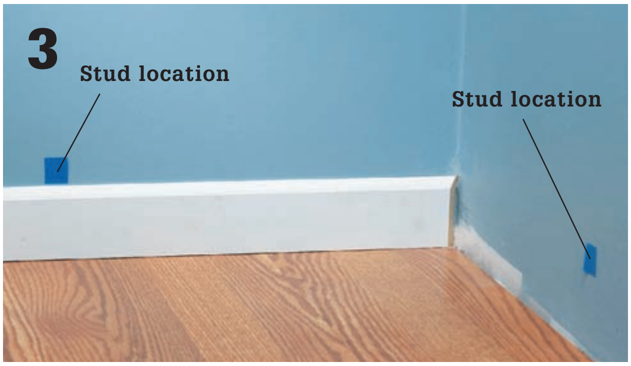
How To Miter Square Inside Corners



Set the miter saw to 45° and place the first piece of trim on-edge, flat on the miter box table and flush against the fence. Hold the piece firmly in place with your left hand and cut the trim with a slow, steady motion. Release the power button and remove the molding after the blade stops.



Back-cut the inside edge of the trim piece with a utility knife so that the top corner will sit flush against the wall corner.



Butt the molding tightly against the wallboard and tack it into place.

Adjust the blade of the miter saw to the opposite 45° angle and cut the mating piece. Test the fit of the joint, adjusting the miter angle if necessary. Once the fit is tight, nail both pieces at stud locations.

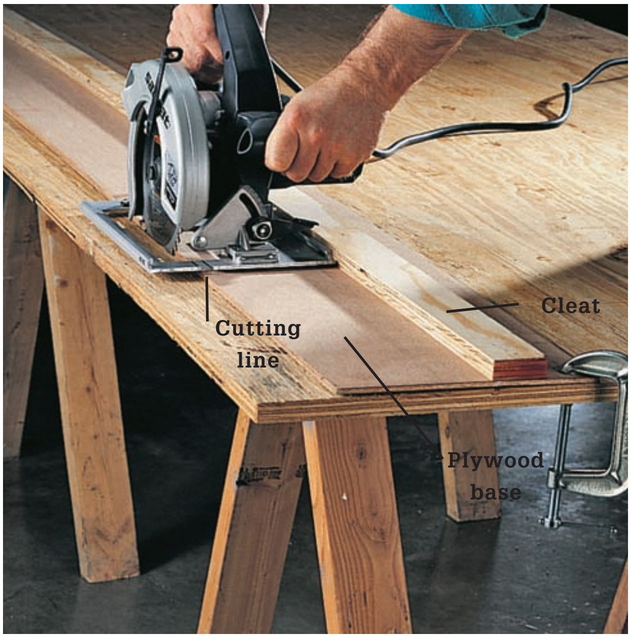
Building a Straightedge Guide

Making straight and accurate cuts on plywood or paneling is a challenge. Even the best carpenter can't always keep the blade on the cut line, especially over a longer span. A straightedge guide solves this problem as long as you keep the saw's base plate flush with the edge of the cleat.

The cleated edge of the guide provides an accurate anchor for the base plate of the saw as the blade passes through the material. You can make a straight cleat edge by ripping the first 2" off of an existing plywood panel and using the factory edge. Use a fine-toothed blade for rip cuts and a plywood blade for splinter-free crosscuts.

Tools & Materials ▸

- C-clamps
- Pencil
- Circular saw
- ¼" Plywood base (10 × 96")
- ¾" Plywood cleat (2 × 96")
- Carpenter's glue



A straightedge guide overcomes the difficulty of making square rip cuts and other square cuts on long workpieces. The guide is built square, ensuring that any cuts made with it will be square as well.

How to Build a Straightedge Guide

Apply carpenter's glue to the bottom of the ¾" plywood cleat, then position the cleat on the ¼" plywood base, 2" from one edge. Clamp the pieces together until the glue dries.

Position the circular saw with its foot tight against the ¾" plywood cleat. Cut away the excess portion of the plywood base with a single pass of the saw to create a square edge.

To use the guide, position it on top of the workpiece, so the guide's square edge is flush with the cutting line on the workpiece. Clamp the guide in place with C-clamps.

Cutting Mitered Returns

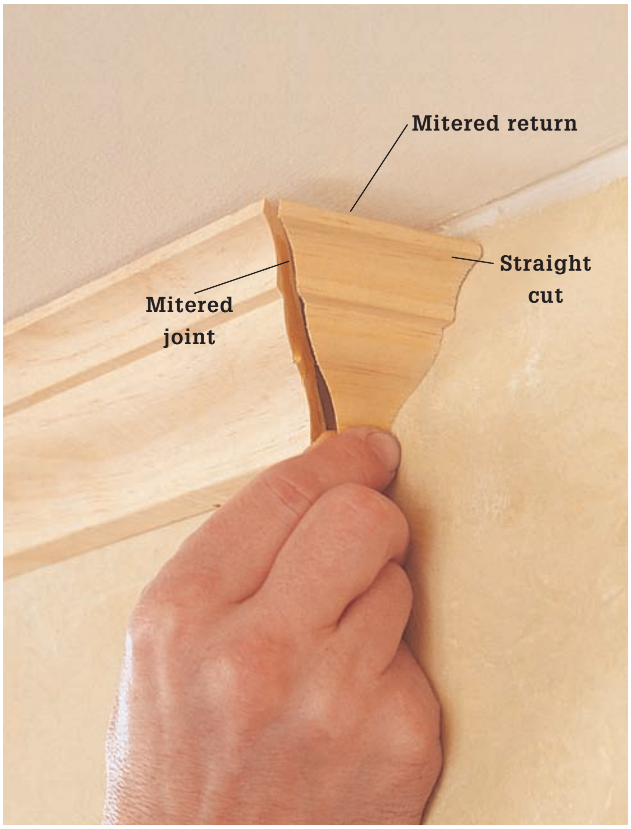
Mitered returns are a decorative treatment used to hide the end grain of wood and provide a finished appearance. Mitered returns range from tiny pieces of base shoe up to very large crown moldings. They are also commonly used when installing a stool and apron treatment or on decorative friezes above doors.

Bevel returns are another simple return option for chair rail, baseboard, and base shoe. A bevel return is simply a cut at the end of the molding that "returns" the workpiece back to the wall at an angle. The biggest advantage to using mitered returns rather than bevel returns is that mitered returns already have a finished surface. Bevel returns require more touchups.

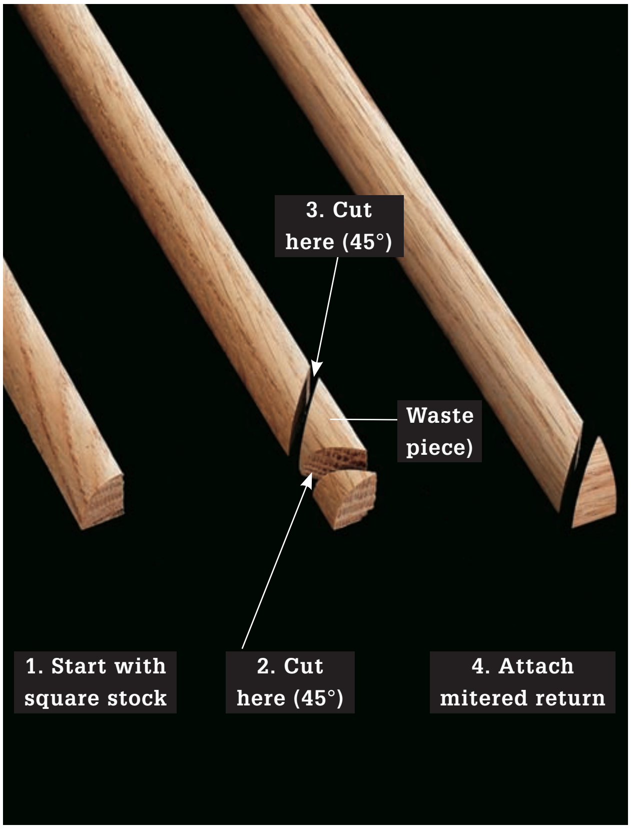
Cutting mitered returns for small moldings, such as quarter-round, or for thin stock, such as baseboard, can be tricky when using a power miter saw. The final cut of the process leaves the return loose where it can sometimes be thrown from the saw due to the air current of the blade. Plan on using a piece of trim that is long enough to cut comfortably, or you will find yourself fighting the saw.

Tools & Materials ▸

Combination square	Pneumatic finish nail gun
Utility knife	Air compressor
Power miter saw	Air hose
Miter box and back saw	T-bevel
Pencil	Molding
Tape measure	Wood glue

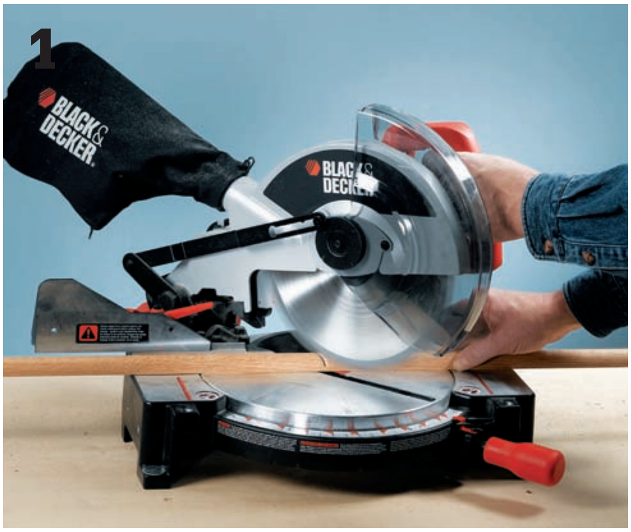


Mitered returns finish molding ends that would otherwise be exposed. Miter the main piece as you would at an outside corner. Cut a miter on the return piece, then cut it to length with a straight cut so it butts to the wall. Attach the return piece with wood glue.

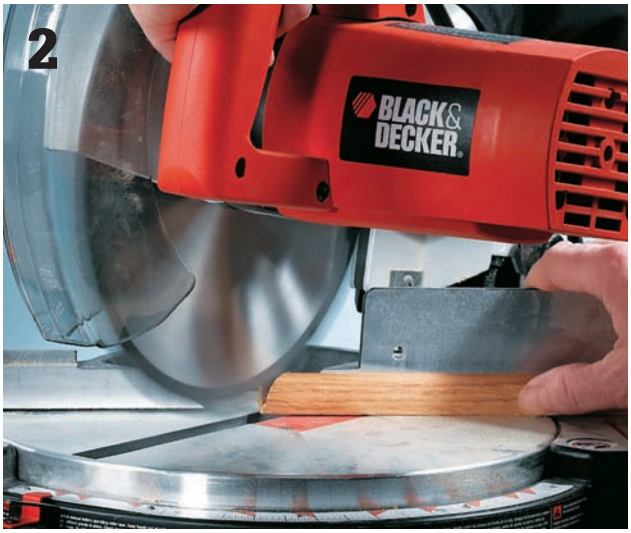


Returns are made from two 45° angle cuts. The scrap piece is removed and the return piece is glued into place.

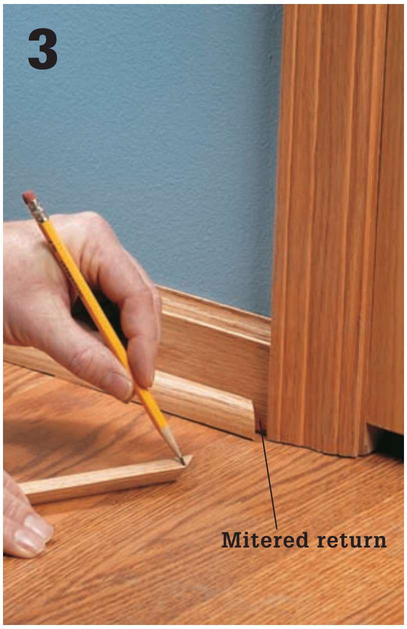
How to Cut Mitered Base Shoe Returns



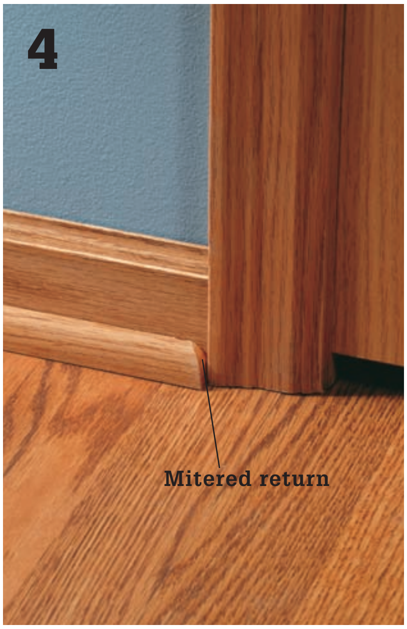
Measure and mark the molding to length. Adjust the miter saw blade to 45° and back-miter the molding, cutting the front edge to the desired overall length of the trim. Nail the back-mitered piece in place using a square to line it up flush with the edge of the door casing.



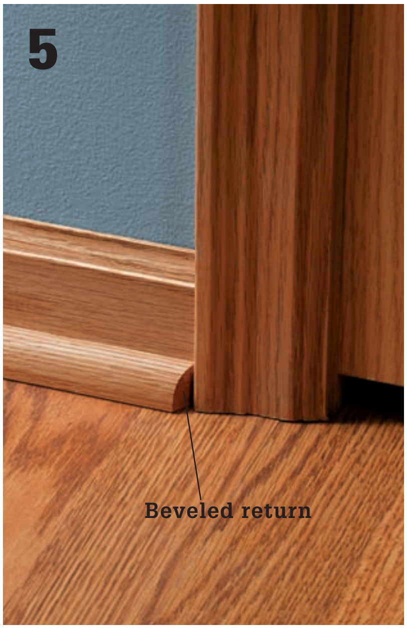
Adjust the blade of the miter saw to the opposite 45° angle and miter-cut the molding using a slow, steady stroke.



Hold the mitered molding against the baseboard at a right angle above the installed base shoe. Mark the molding at the depth of the installed base shoe. Square-cut the molding at the cutoff mark. Because making this cut with a power saw is very dangerous, use a miter box and a back saw. The cut-off piece will be the mitered return piece.



Check the fit of the return against the baseboard. If it is too small, repeat steps 3 and 4, making the piece slightly larger. If the return is too large, trim it to fit with a utility knife or sandpaper. Once the return fits properly, glue it in place with wood glue.



OPTION: Beveled returns are a quick and simple alternative to mitered returns. They require finish touchup after the trim is installed.

Establishing Level, Plumb & Square

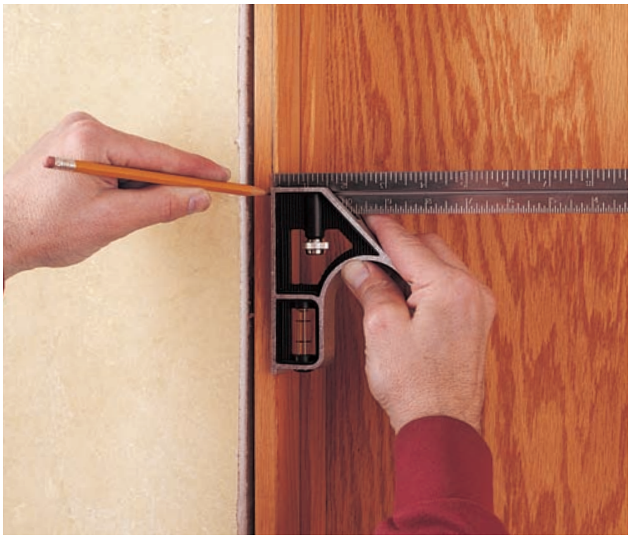
Good carpenters strive to achieve three basic ideals in their work: plumb, level, and square. Go into any home, however, and you are bound to find walls that bow, floors that slope, and corners that don't form right angles. This doesn't always mean the carpenter did a poor job, but rather reflects the fact that wood and many building materials are natural products that expand, contract, and settle with the seasons. These natural movements do not always occur at the same rate, however, causing fluctuations that sometimes become permanent. That's why it's no surprise that older homes more commonly have larger fluctuations.

These movements can make trimming a built-in project challenging. Level and plumb are hard concepts to apply when the floor slopes heavily and corners float in or out. Compounding the problem further is that power tools are made to cut and shape wood precisely. Preset angles on a compound miter saw don't include angles such as 47 degrees.

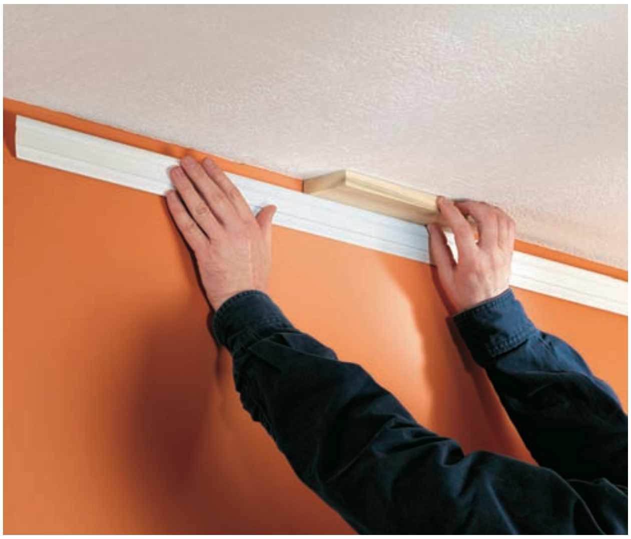
In most cases, your installation of built-ins and trim will require compromises. Keep in mind the overall appearance of your project and remember that the concepts of plumb and level can be relative concepts. Strive to achieve them for quality joints, but don't insist on them when they affect the overall appearance of your project negatively. Here are a couple of fine pieces of advice to keep in mind:

- Level to the room is more important than level to the earth.
- Flat is more important than level.

A plumb bob is hung to establish a plumb (exactly vertical) line. Plumb can be difficult to visualize. Most chalk boxes can double as plumb bobs for rough use.

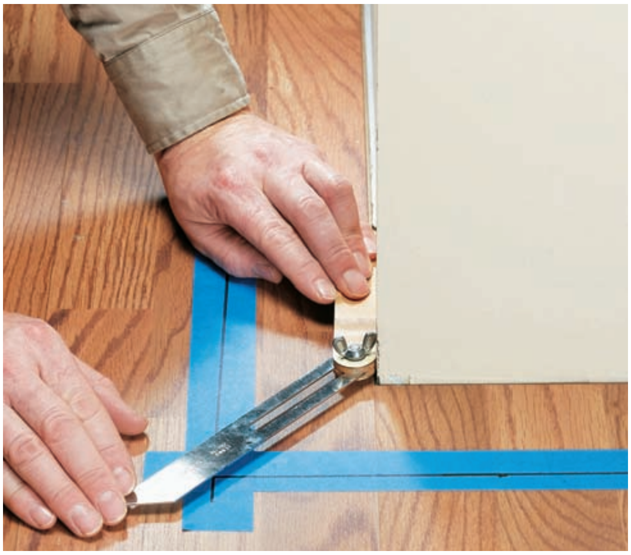


Window and door jambs are normally installed level and plumb, but if they aren't your casing should still follow an even reveal of 3/16" to 1/4" (about the thickness of a nickel) around the inside edge. Set the blade on a combination square to the depth of the reveal, then use the square as a guide for your pencil when marking. Install the casings flush with the mark.



Use a spacer block as a guide to install moldings near a ceiling. The spacer will allow you to easily follow any ups and downs of an uneven ceiling, making the trim run parallel to it rather than exactly level.

Install baseboard as close to level as possible, paying attention to areas where a floor dips or slopes over a longer length. In these instances, "cheat" the baseboard as close to level as you can, leaving a gap below it. You can only cheat the molding to less than the height of your base shoe, or quarter round. These trim pieces will cover the gap because they are thinner and easier to flex to the contour of your floor. Cheating the molding will also make cutting miters easier because they will require less of a bevel.



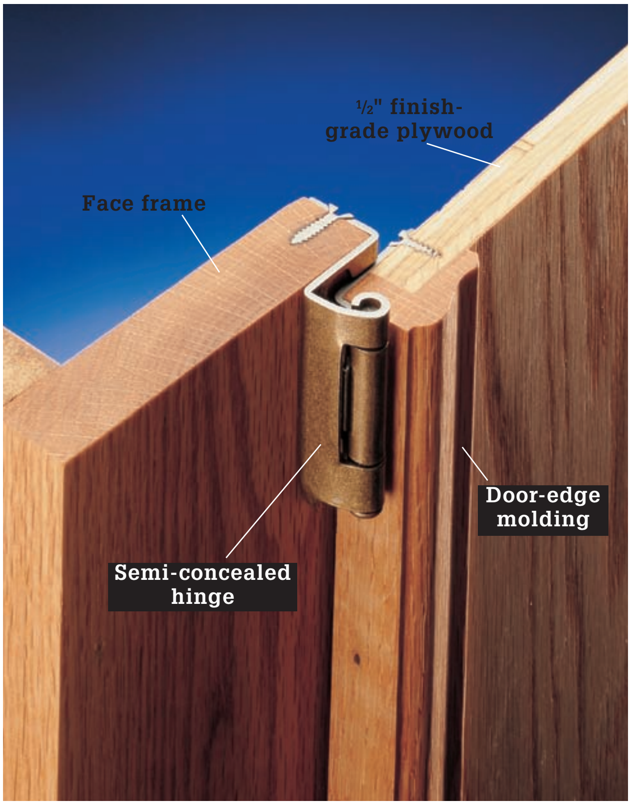
Use a T-bevel to measure for miter-cutting trim on out-of-square corners. Use a piece of scrap 1 × 4 to trace lines parallel to the corner walls. Place the T-bevel so the blade runs from the corner of the wall to the point where the lines intersect. Transfer this angle to your miter saw to cut your moldings.

Adding Doors

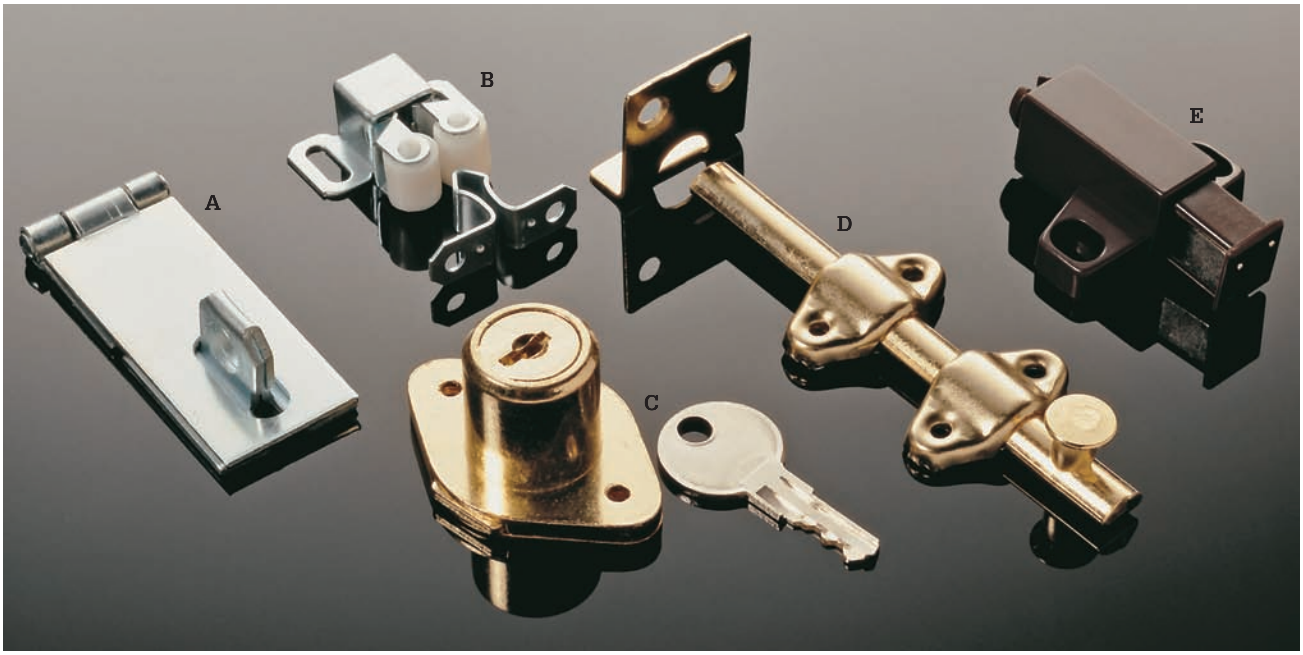
Cabinet doors are easy to make using ½" finish-grade plywood, and door-edge moldings. When hung with semi-concealed overlay hinges, do-it-yourself panel-style doors require no complicated routing or mortising techniques. You can build them to any size needed, and finish them to match your tastes.

Another easy option is to buy ready-made cabinet doors from a cabinet manufacturer or cabinet refacing company, and hang them yourself using semi-concealed hinges. You also can have a professional cabinetmaker design and build custom cabinet doors to your specifications—a good choice if you want wood-framed doors with glass panels.

Other do-it-yourself door options include sliding doors, solid-glass doors, and frameless doors (page opposite).



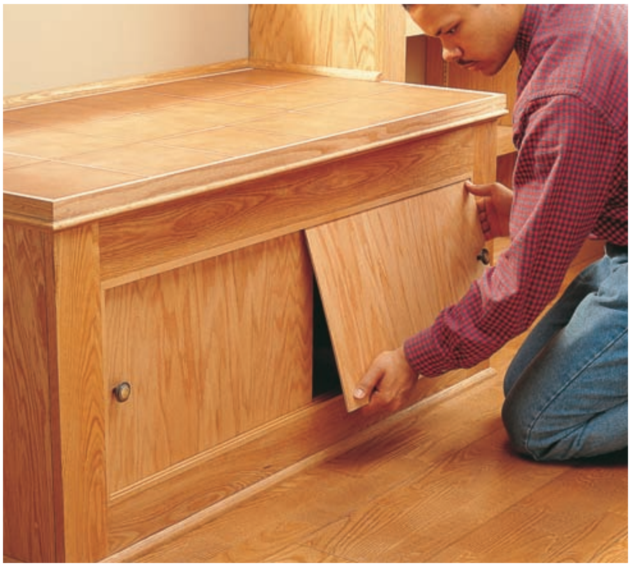
Easy-to-build overlay doors, made with ½" finish-grade plywood panels framed with door-edge moldings, are designed to overhang the face frame by about ⅜" on each side. Semi-concealed overlay hinges, which require no mortising, are attached to the back of the door and to the edge of the face frame. This door style also can be adapted to make folding doors.



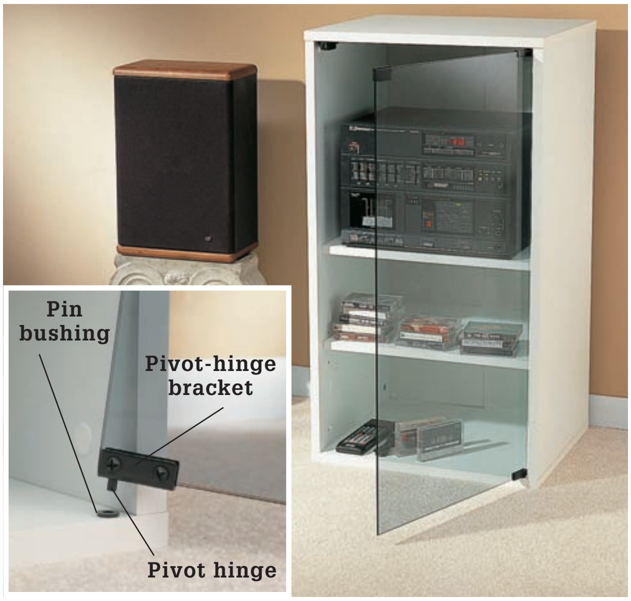
Door-catch hardware is recommended if your doors do not use self-closing hinges, or if you want to lock them. Common types of hardware include: utility hasp (A), roller catch (B), keyed lock (C), brass door bolt (D), and magnetic push latch (E) commonly used for solid glass doors.

Door Options

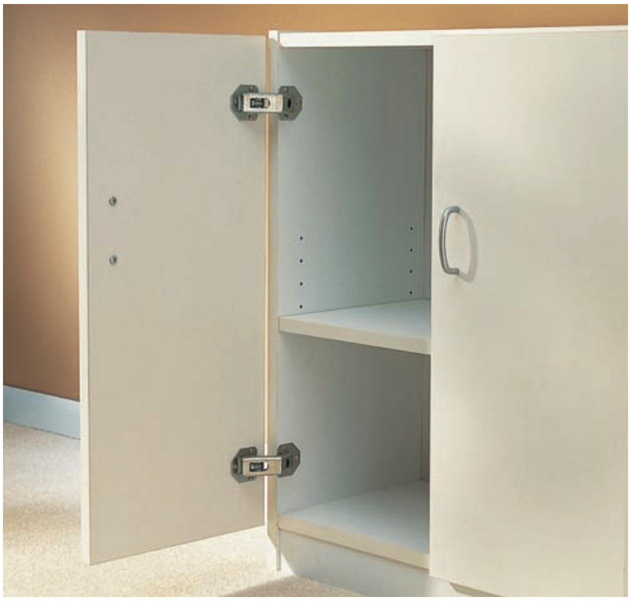
Ready-made cabinet doors are available in stock sizes from cabinet manufacturers and cabinet refacing companies. Or, you can have doors custom-built by a professional cabinetmaker. Install these doors with semi-concealed overlay hinge.



Sliding doors are a good choice if limited space makes it impractical to install swinging doors. Build a pair of sliding doors from ¼" finish-grade plywood, cut so they are ½" shorter than the opening and will overlap by about 2" in the center. Attach door-track moldings to the top, bottom, and sides of the door opening. Install the doors by sliding them up into the top track, then lowering them into the bottom track.



Glass doors give a contemporary look to built-in projects. Use ¼" tempered glass with smoothed edges, not ordinary window glass, for doors. To install a glass door, drill holes in the top and bottom of the door opening, and insert pivot-hinge bushings. Mount the door using pivot-hinge brackets attached to the glass with setscrews (inset).



Frameless doors are common on contemporary-style built-ins constructed without face frames — especially those made with melamine-covered particleboard. Frameless doors are mounted with concealed hinges attached to the inside surface of the built-in.

Basic Drawers

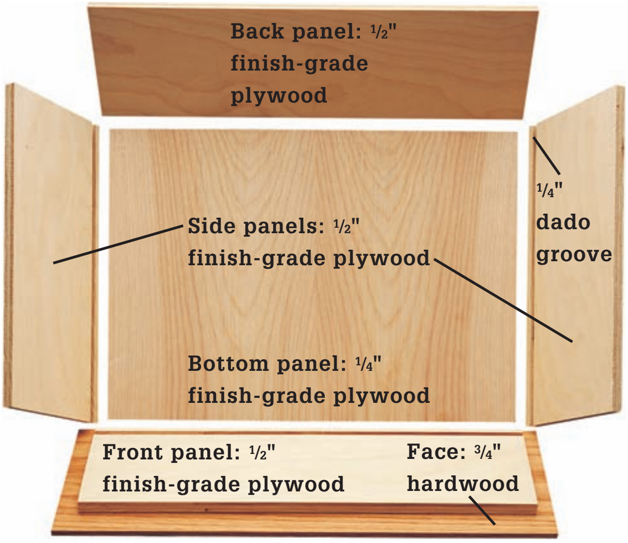
In its simplest form, a drawer is nothing more than a wooden box that slides in and out on a permanent shelf. Adding drawer slide hardware, a hardwood drawer face, and ornamental knobs or pulls makes drawers look more professional.

The drawer shown on the following page is simple to build and will work for any of the projects in this book. The design is called an "overlay" drawer because it features a hardwood drawer face that overhangs the cabinet face frame.

Ready-made hardwood drawer faces are sold by companies specializing in cabinet refacing products. You can also make your own drawer faces by cutting hardwood boards to the proper size and using a router with an edging bit to create a decorative flair.

A center-mounted drawer slide attached to the bottom of the drawer allows the drawer to glide smoothly and acts as a support for drawers installed in open cabinets.

The height, width, and depth of the cabinet, and the opening for the drawer must be carefully measured before the drawer is built, to ensure a good fit.


Back panel: ½" finish-grade plywood
Side panels: ½" finish-grade plywood
¼" dado groove
Bottom panel: ¼" finish-grade plywood
Front panel: ½" finish-grade plywood
Face: ¾" hardwood

The basic overlay drawer is made using ½" plywood for the front, back, and side panels, and ¼" plywood for the bottom panel. The bottom panel fits into a ¼" dado near the bottom of the front and side panels, and is nailed to the bottom edge of the back panel. The hardwood drawer face is screwed to the drawer front from inside the drawer box.

Directions: Overlay Drawer

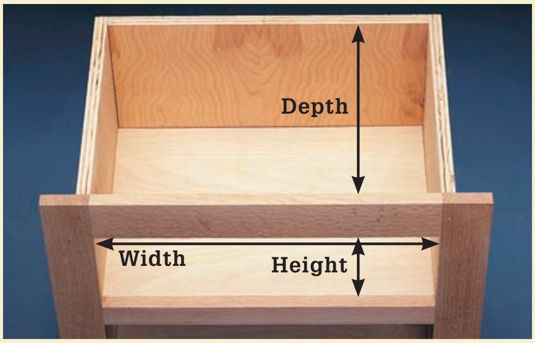
INSTALL THE DRAWER TRACK

Install the track for the drawer slide, following the manufacturer's directions. If the slide will be supported by the face frame and the back panel, mount it using the rear bracket included with the slide kit. If the track will rest on a shelf, install it before the cabinet is assembled.

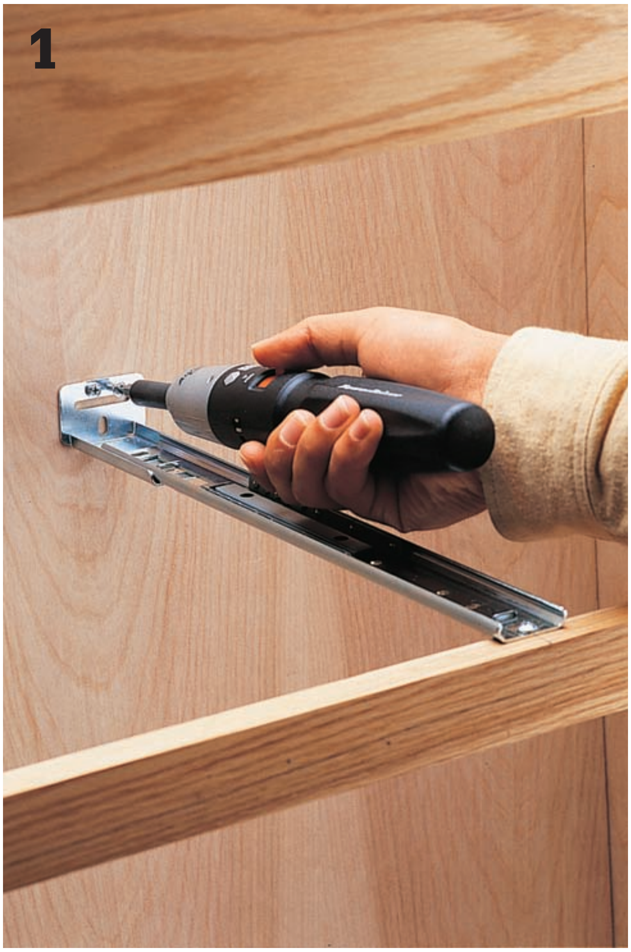
BUILD THE DRAWER FRAME

Measure the interior dimensions of the face frame and the depth of the cabinet from the back edge of the face frame to the interior surface of the back panel. Then follow the dimensions listed in the table (opposite page) to cut the drawer pieces to size.

Tip: Measuring the Cabinet ▸



Part		Dimension
Sides	length	Depth of opening, minus 3"
	height	Height of opening, minus ½"
Front	length	Width of opening, minus 1½"
	height	Height of opening, minus ½"
Back	length	Width of opening, minus 1½"
	height	Height of opening, minus 1"
Bottom	length	Width of opening, minus 1"
	height	Depth of opening, minus 2¾"
Face	length	Width of opening, plus 1"
	height	Height of opening, plus 1"



Mount the track for the drawer slide with the rear bracket when installing a drawer in an open cabinet.

Outline ¼"-wide dado grooves on the interior faces of the front and side panels. Rout ¼"-deep dado grooves along the marked outlines, using a router with a ¼" straight bit and a straightedge guide.

Clamp and glue the drawer panels together with the front and back panels between the side panels and the top edges of the panels aligned. Reinforce the joints with 2" finish nails driven through the front and back into the side panels.

ATTACH THE DRAWER BOTTOM

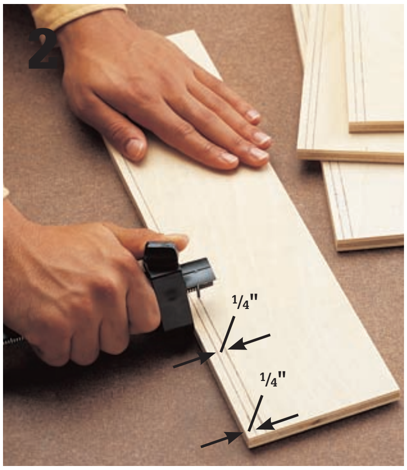
Let the glue dry and remove the clamps. Slide the bottom panel into the dado grooves from the back of the drawer box. Do not apply glue to the dado grooves or the bottom panel.

Attach the back edge of the bottom panel to the back panel, using brad nails spaced every 4".

APPLY THE FINISHING TOUCHES

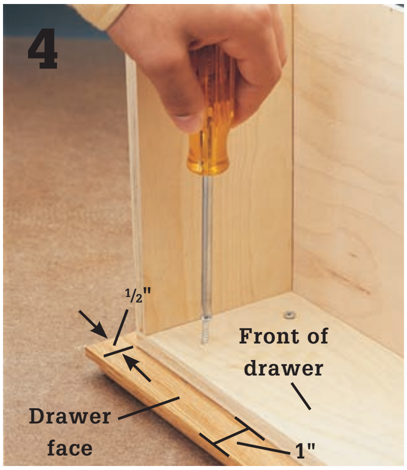
Finish the drawer face to match your project, and allow the finish to dry. Position the drawer box against the back side of the drawer face, so the face overhangs by ½" on the sides and bottom, and 1" on the top. Attach the face with 1" screws driven from inside the drawer box.

Attach the drawer slide insert to the drawer bottom, following the manufacturer's directions. Attach any drawer pulls or knobs as desired, and slide the drawer into the cabinet, making sure the drawer slide and insert are aligned.



Outline and then rout a dado groove along the bottom edge of the front and side panels.

Slide the bottom panel into the dado grooves of the drawer assembly.



Attach the face of the drawer by driving screws through the front panel into the face.

Preparing for the Finish

A properly prepared wood surface absorbs finish materials evenly, focusing attention on the quality and color of the wood and the finish. A poorly prepared surface focuses attention on itself and its flaws.

Sanding or filling scratches and gouges, removing dents and stains, and carefully finish sanding are the essential steps in preparing for the finish. With many woods (especially softwoods like pine) you can create a more even finish by sealing the wood with sanding sealer immediately after finish sanding, then sanding the sealer lightly with 220-grit sandpaper after it dries. For exceptionally smooth, rich finishes (particularly on open-grain hardwoods like mahogany), apply wood grain filler to fill in checks and large pores, creating a smooth-as-glass surface.

Before beginning the final preparations for the finish, sand the workpiece with medium-grit sandpaper to remove small scratches and other surface problems—this is especially important if you did not use sanding as a final stage of finish removal. Any scratches, gouges, dents, or stains that survive the intermediate sanding should be remedied before you finish-sand.

Do your final stage of finish sanding immediately before you apply the finish—the smooth surface created by finish sanding is easily scratched or discolored.

Sand wood with power sanders, like the random-orbit sander shown above, to make quick work of the initial finish sanding stages, while producing a very smooth wood surface.

How to Prepare a Wood Surface

Get rid of glue. Dried glue won't absorb wood stain or any other penetrating coloring agents, so glue spills and squeeze-out show up as bright blotches if they're not removed by sanding or scraping before the finish is applied.

Sandpaper Grit Chart ▸

Grit	Task
80 to 100	Finish removal
120 to150	Preliminary finish sanding
180	Final sanding for softwood; intermediate stage of finish sanding for hardwood
220	Final sanding for hardwood
300 to 400	Sanding between finish layers
600 wet/dry	Wet sanding of final finish layer

Aluminum Oxide Sandpaper
Paint, Wood, Me
Final Sanding
Very Fine • 220 Grit

Choose the right sandpaper for the job. Aluminum oxide and garnet are two common types. Aluminum oxide is a good general-use product suitable for most refinishing and finishing purposes. Garnet is usually cheaper than aluminum oxide, but it wears out much more quickly. Use sandpaper with the proper grit (higher numbers indicate finer grit—see chart above).

BARTLEY
WOOD FILLER
DARK
BARTLEY
PASTE WOOD FILLER
LIGHT

Apply wood grain filler that approximately matches the natural color of your wood. Available in light and dark colors, grain filler creates a smooth surface in open wood grains. Usually manufactured as a gel, it can be applied with a putty knife or a rag, but the excess material should be wiped off with a plastic scraper.

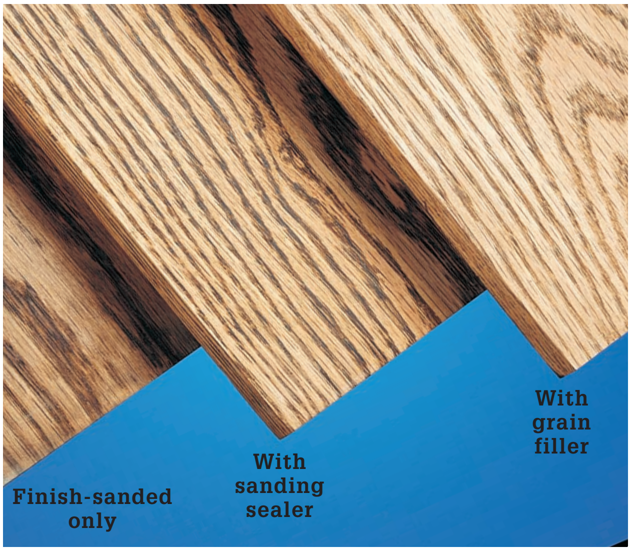
MINWAX
Fast-Drying
POLYURETHANE
Clear Satin
PARKS
Odorless Mineral Spirits

Make your own sanding sealer by blending one part clear topcoat material with one part topcoat solvent. *Note: Use the same topcoat material you plan to apply to the project. Sanding sealer is used before coloring soft or open-grain woods to achieve even stain penetration. To apply, wipe on a heavy coat, then wipe off the excess after a few minutes. Sand lightly with 220-grit sandpaper when dry.*

Surface Preparation

Surface preparation ensures an even, high-quality finish. Finish-sand with progressively finer grits of sandpaper, starting with 100-grit. Hardwood requires finer-grit sandpaper (a final sanding with 220-grit is common) than soft wood (sand to 150-grit). To speed up the process, use a power sander for the first stages of the sanding, then switch to hand-sanding to complete the process.

Finish sanding alone creates a smooth surface, but because wood absorbs stain at different rates, the color can be blotchy and dark. Sealing wood with sanding sealer (either a commercial product or your own concoction of thinned finish) evens out the stain-absorption rates and yields a lighter, more even finish. Filling the grain with a commercial paste filler creates a final finish that feels as smooth as it looks.



Use sanding sealer or grain filler for a fine finish. Finish sanding alone (left) can leave a blotchy surface when stain is applied, but a coat of sanding sealer (center) or grain-filler (right), or both, allows you to create a smoother, more even finish.

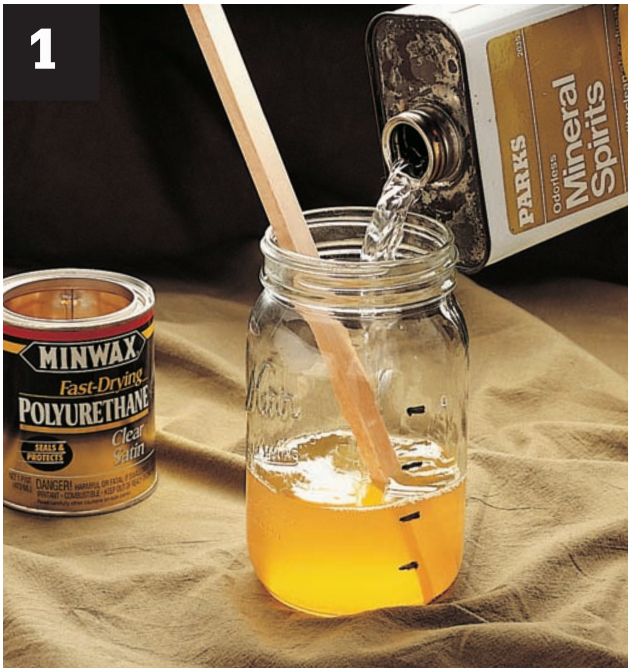
How to Finish-sand

Finish-sand all surfaces with 150-grit sandpaper, following the direction of the grain. Use a finishing sander on flat surfaces and specialty sanding blocks on contours. When sanding hardwood, switch to 180-grit paper and sand again.

Raise the wood grain by dampening the surface with a wet rag. Let the wood dry, then skim the surface with a fine abrasive pad, following the grain.

Use sanding blocks to hand-sand the entire workpiece with the finest-grit paper in the sanding sequence. Sand until all sanding marks are gone and the surface is smooth. (Use bright sidelighting to check your progress.) If using sanding sealer, do that now.

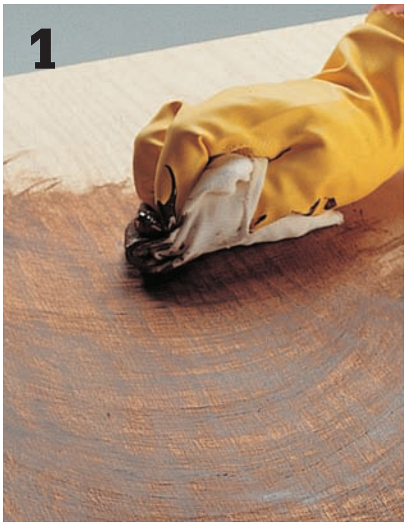
How to Use Sanding Sealer



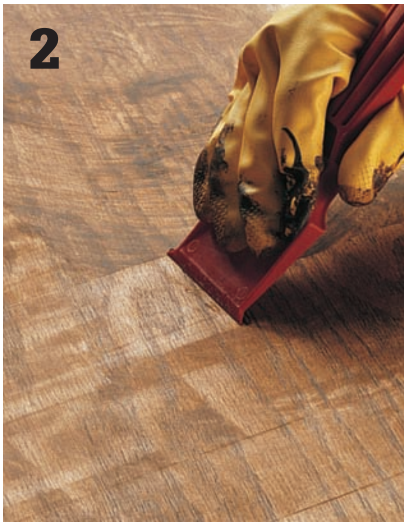
Make your own sanding sealer by blending one part clear topcoat material (not water-based) with one part topcoat solvent. *Note: Use the same topcoat material you plan to apply to the project.*

Wipe on a heavy coat of the sealer, then wipe off the excess after a few minutes. When dry, sand lightly with 220-grit sandpaper.

How to Apply Grain Filler



After finish sanding, use a rag or putty knife to spread a coat of grain filler onto the wood surface. With a polishing motion, work the filler into the grain. Let the filler dry until it becomes cloudy (usually about 5 minutes).



Remove excess filler by drawing a plastic scraper across the grain of the wood at a 45° angle. Let the grain filler dry overnight.

Lightly hand-sand the surface, following the direction of the grain, with 220-grit sandpaper. Finally, dampen a clean cloth with mineral spirits and use it to thoroughly clean the surface.

Installing Cabinets

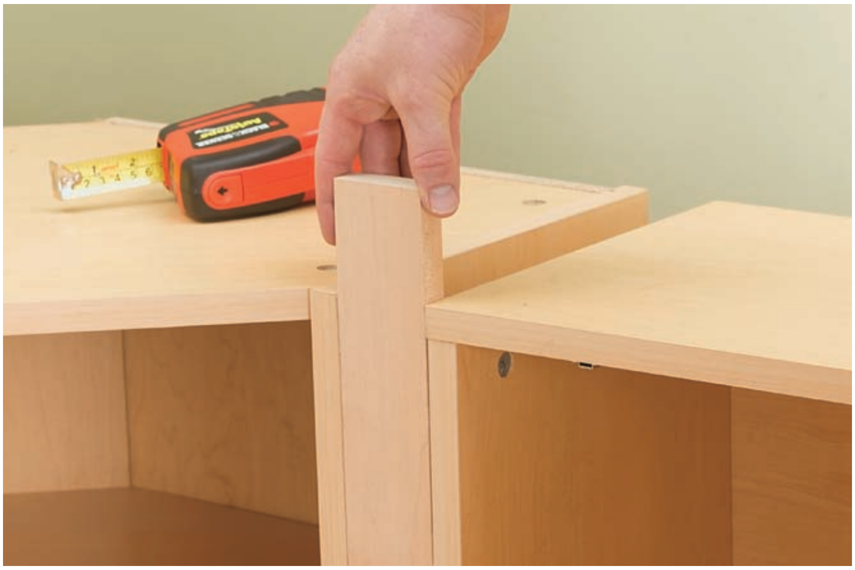
Cabinets must be firmly anchored to wall studs, and they must be plumb and level when installed. The best way to ensure this is by attaching a ledger board to the wall to assist in the installation. As a general rule, install the upper cabinets first so your access is not impeded by the base cabinets. (Although some professionals prefer to install the base cabinets first so they can be used to support the uppers during installation.) It's also best to begin in a corner and work outward from there.

Tools & Materials ▸

- Handscrew clamps
- Level
- Hammer
- Utility knife
- Nail set
- Stepladder
- Drill
- Counterbore drill bit
- Cordless screwdriver
- Jig saw
- Cabinets
- Trim molding
- Toe-kick molding
- Filler strips
- Valance
- 6d finish nails
- Finish washers
- #10 × 4" wood screws
- #8 × 2½" screws
- 3" drywall screws

Stock cabinets are sold in boxes that are keyed to door and drawer packs (you need to buy these separately). It is important that you realize this when you are estimating your project costs at the building center (often a door pack will cost as much or more than the cabinet). Also allow plenty of time for assembling the cabinets out of the box. It can take an hour or more to put some more complex cabinets together.

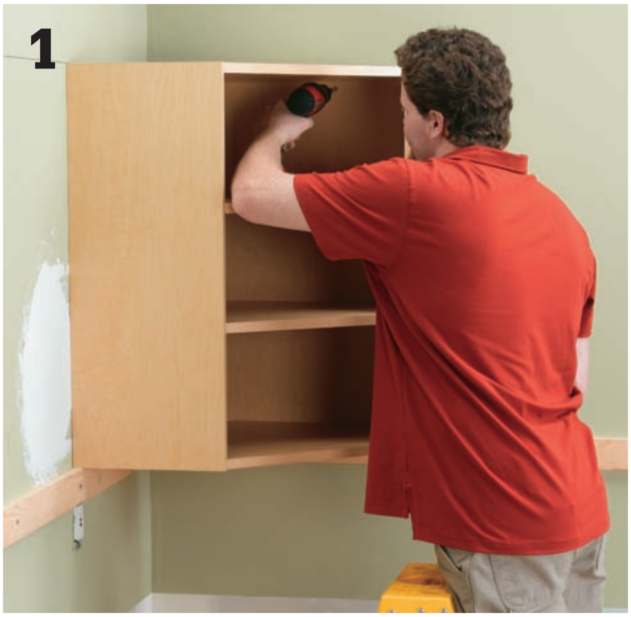
How to Fit a Corner Cabinet



Before installation, test-fit corner and adjoining cabinets to make sure doors and handles do not interfere with each other. If necessary, increase the clearance by pulling the corner cabinet away from the side wall by no more than 4". To maintain even spacing between the edges of the doors and the cabinet corner, cut a filler strip and attach it to the corner cabinet or the adjoining cabinet. Filler strips should be made from material that matches the cabinet doors and face frames.

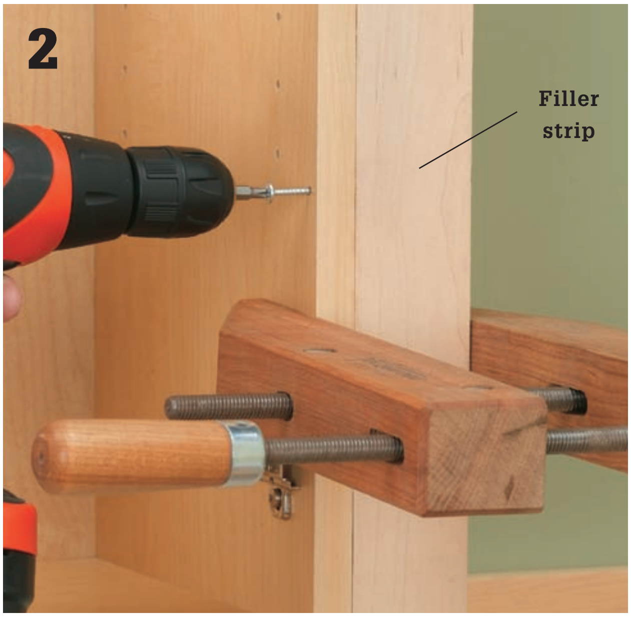
How to Install Wall Cabinets

1



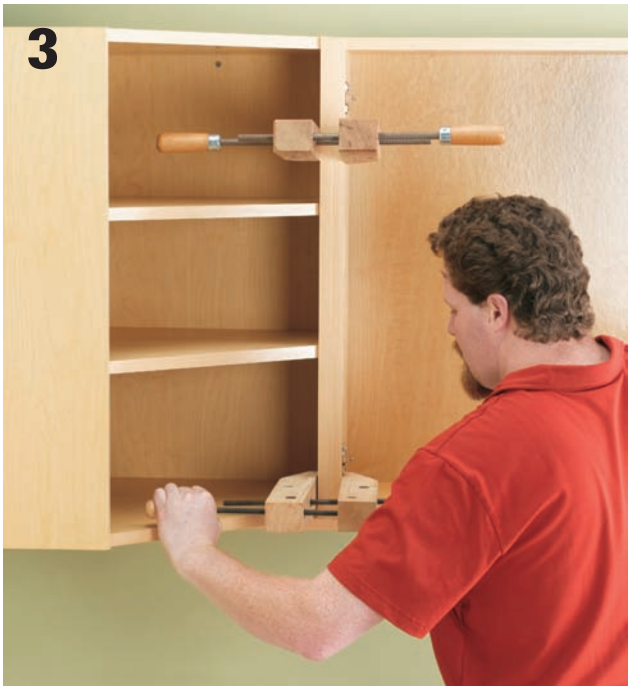
Position a corner upper cabinet on a ledger and hold it in place, making sure it is resting cleanly on the ledger. Drill 3⁄16" pilot holes into the wall studs through the hanging strips at the top, rear of cabinet. Attach the cabinet to the wall with 2½" screws. Do not tighten fully until all cabinets are hung.

2



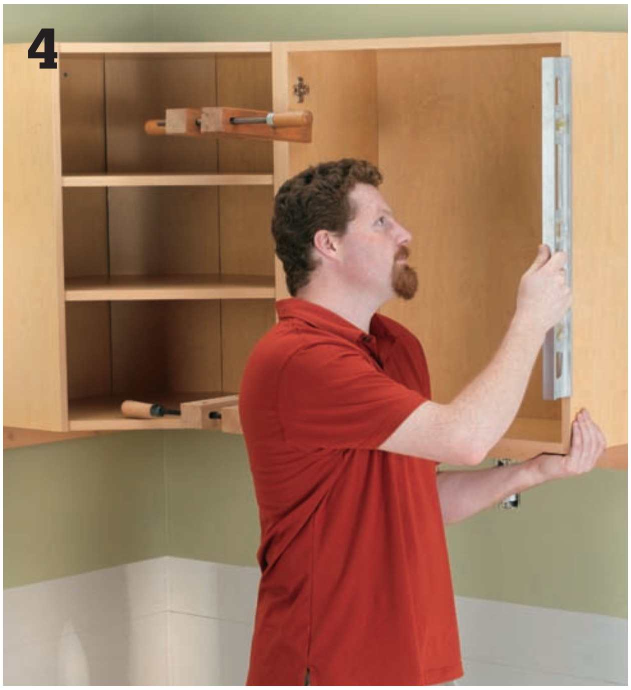
Attach a filler strip to the front edge of the cabinet, if needed. Clamp the filler in place, and drill counterbored pilot holes through the cabinet face frame, near hinge locations. Attach filler to cabinet with 2½" cabinet screws or flathead wood screws.

3

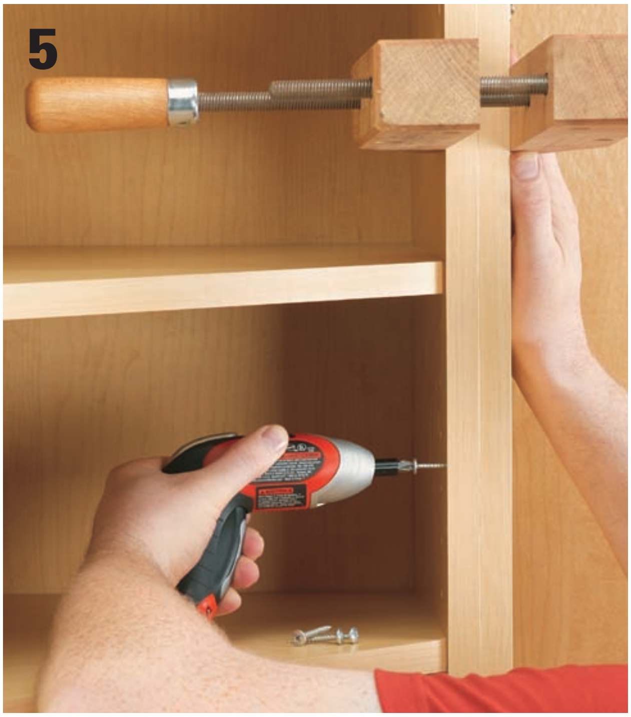


Position the adjoining cabinet on the ledger, tight against the corner cabinet or filler strip. Clamp the corner cabinet and the adjoining cabinet together at the top and bottom. Handscrew clamps will not damage wood face frames.

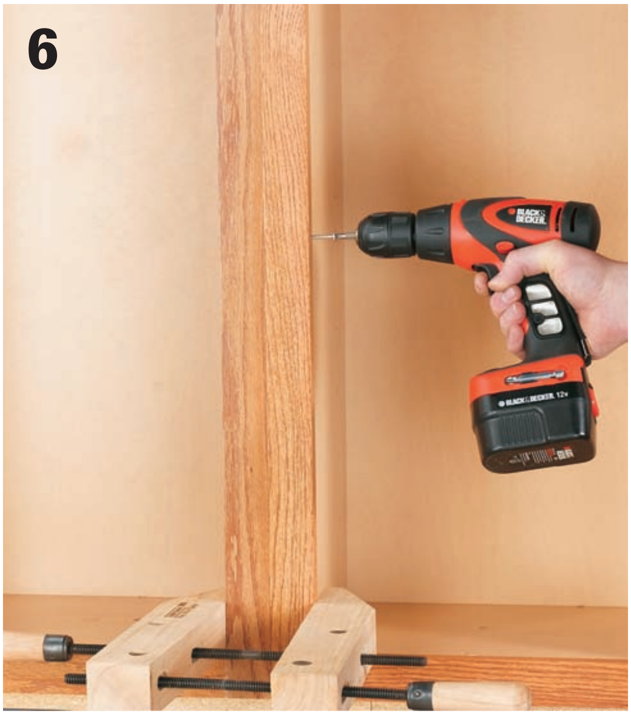
4



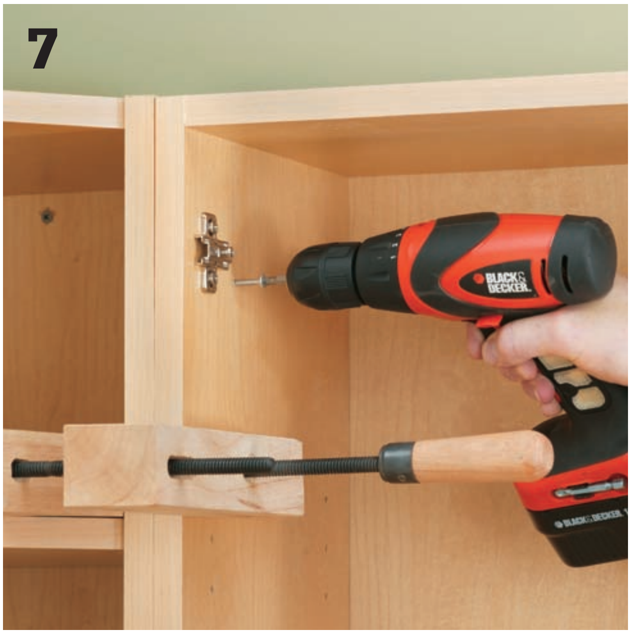
Check the front cabinet edges or face frames for plumb. Drill 3⁄16" pilot holes into wall studs through hanging strips in rear of cabinet. Attach cabinet with 2½" screws. Do not tighten wall screws fully until all cabinets are hung.



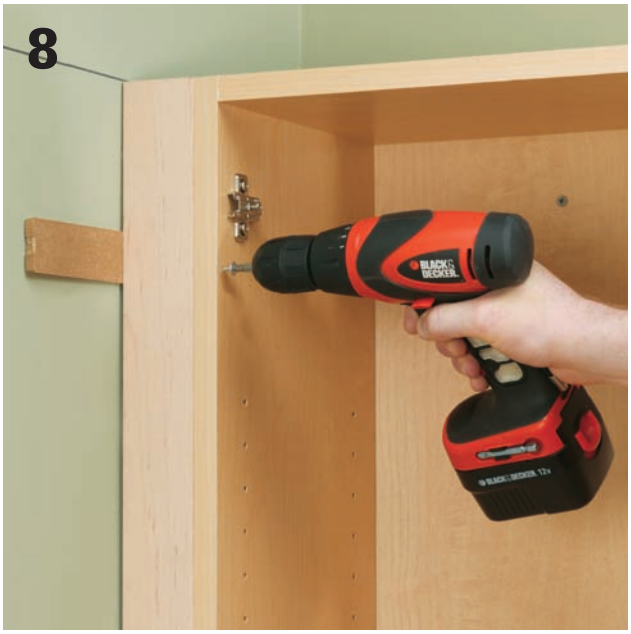
Attach the corner cabinet to the adjoining cabinet. From inside corner cabinet, drill pilot holes through face frame. Join cabinets with sheet-metal screws.



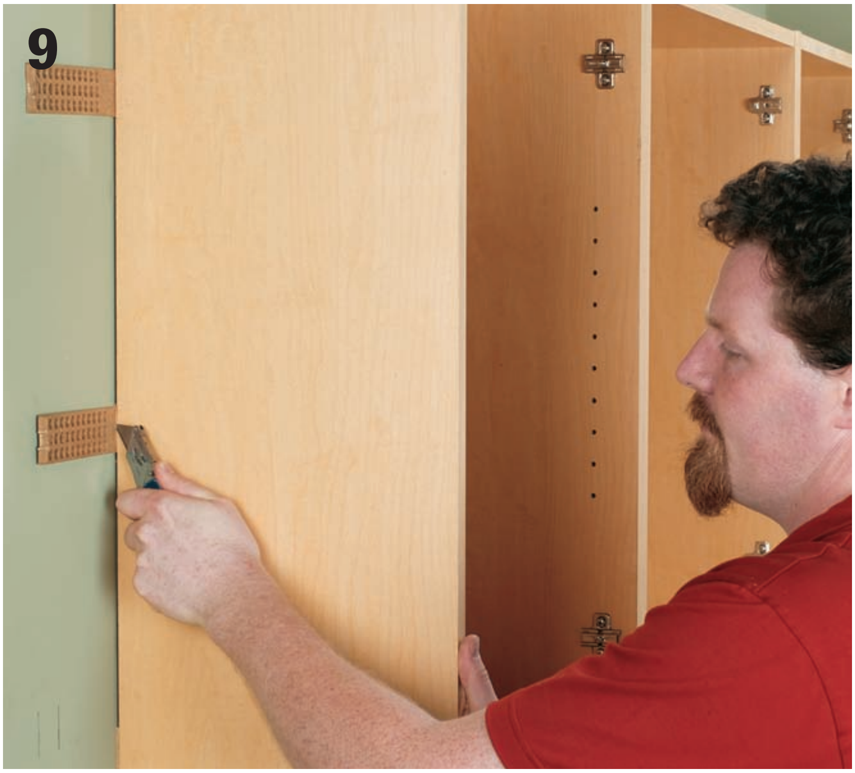
Position and attach each additional cabinet. Clamp frames together, and drill counterbored pilot holes through side of face frame. Join cabinets with wood screws. Drill 3/16" pilot holes in hanging strips, and attach cabinet to studs with wood screws.



Join frameless cabinets with #8 × 1¼" panhead wood screws or wood screws with decorative washers. Each pair of cabinets should be joined by at least four screws.

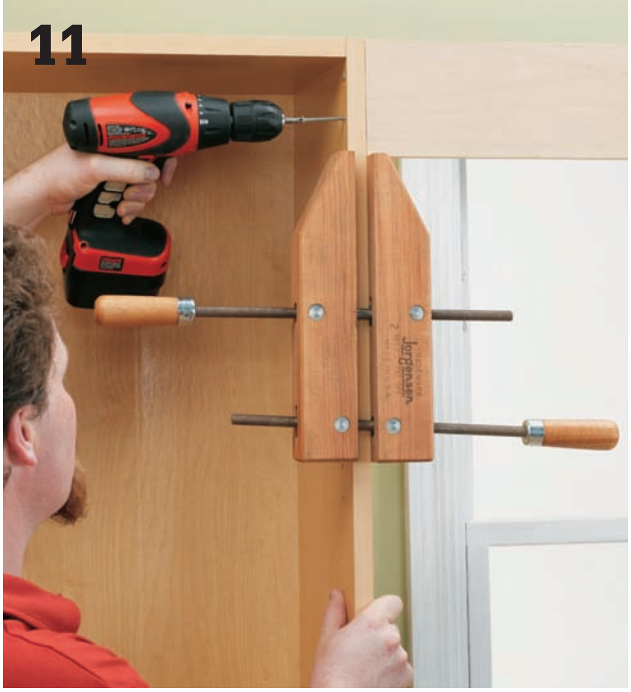


Fill gaps between the cabinet and wall or neighboring appliance with a filler strip. Cut the filler strip to fit the space, then wedge wood shims between the filler and the wall to create a friction fit that holds it in place temporarily. Drill counterbored pilot holes through the side of the cabinet (or the edge of the face frame) and attach filler with screws.



Remove the temporary ledger. Check the cabinet run for plumb, and adjust if necessary by placing wood shims behind cabinet, near stud locations. Tighten wall screws completely. Cut off shims with utility knife.

Use trim moldings to cover any gaps between cabinets and walls. Stain moldings to match cabinet finish.



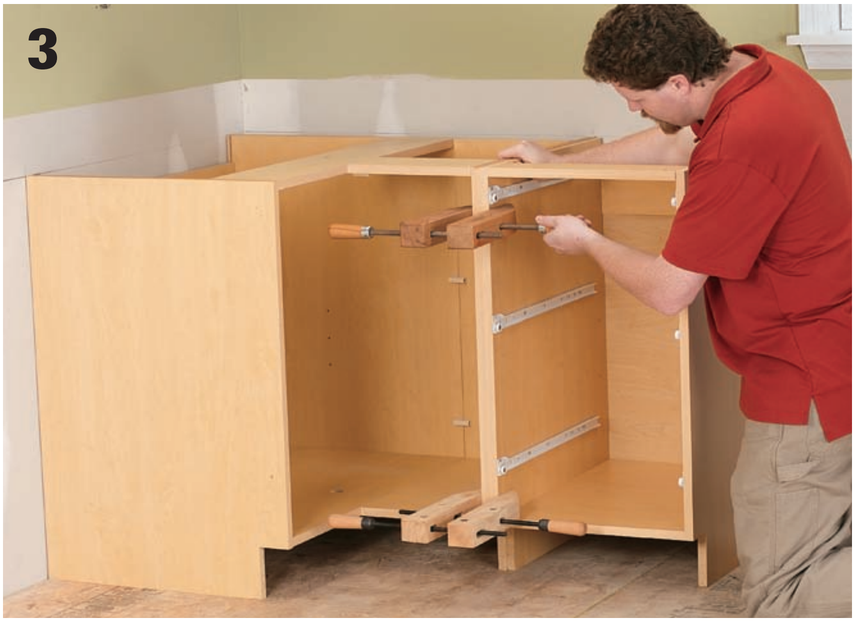
Attach decorative valance above sink. Clamp valance to edge of cabinet frames, and drill counterbored pilot holes through cabinet frames into end of valance. Attach with sheet-metal screws.

Install the cabinet doors. If necessary, adjust the hinges so that the doors are straight and plumb.

How to Install Base Cabinets

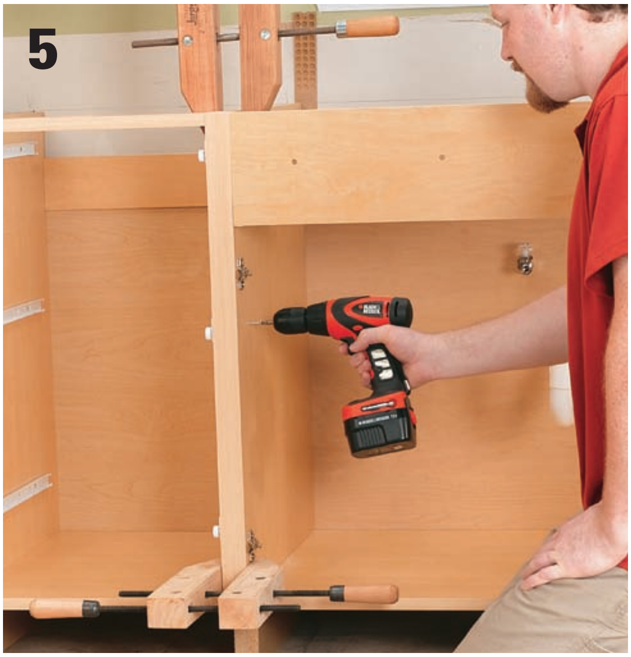
Begin the installation with a corner cabinet. Draw plumb lines that intersect the 34½" reference line (measured from the high point of the floor) at the locations for the cabinet sides.

Place cabinet in corner. Make sure the cabinet is plumb and level. If necessary, adjust by driving wood shims under cabinet base. Be careful not to damage flooring. Drill 3⁄16" pilot holes through the hanging strip and into wall studs. Tack the cabinet to the wall with wood screws or wallboard screws.

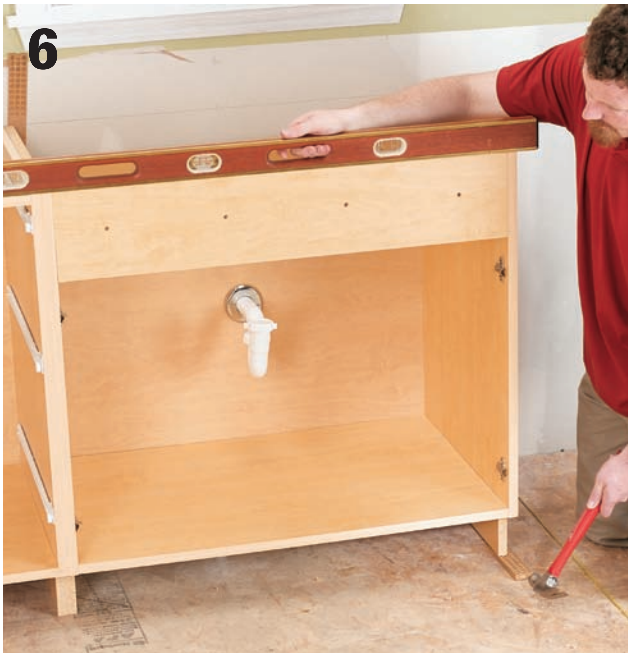


Clamp the adjoining cabinet to the corner cabinet. Make sure the new cabinet is plumb, then drill counterbored pilot holes through the cabinet sides or the face frame and filler strip. Screw the cabinets together. Drill 3⁄16" pilot holes through hanging strips and into wall studs. Tack the cabinets loosely to the wall studs with wood screws or wallboard screws.

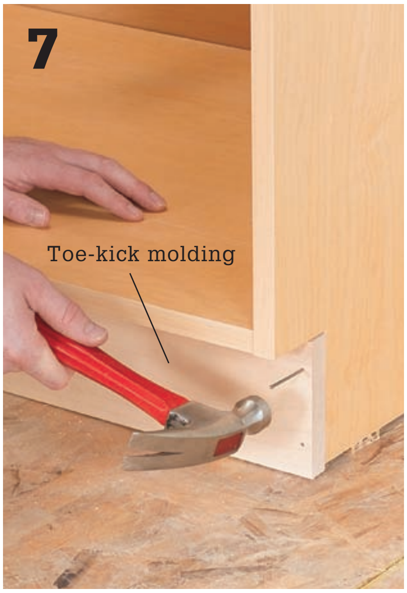
Use a jig saw to cut any cabinet openings needed in the cabinet backs (for example, in the sink base seen here) for plumbing, wiring or heating ducts.



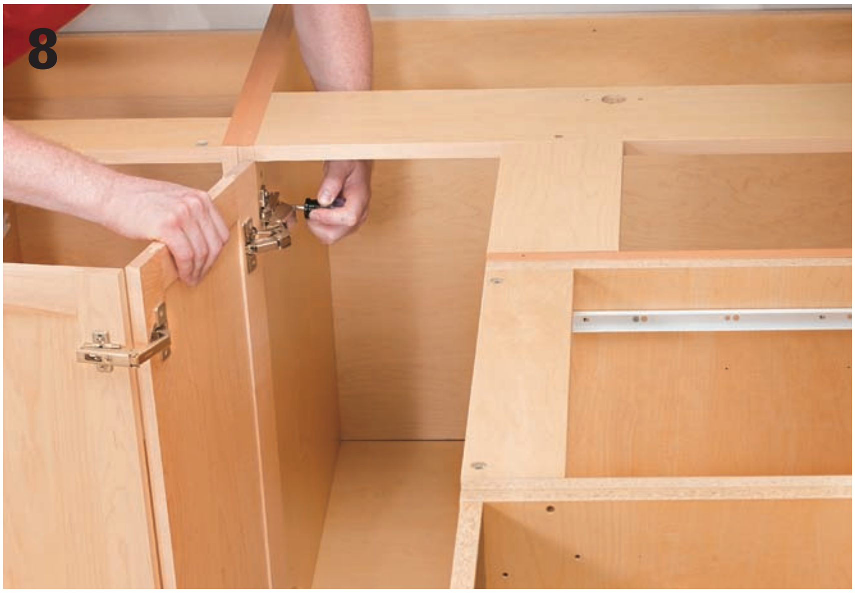
Position and attach additional cabinets, making sure the frames are aligned and the cabinet tops are level. Clamp cabinets together, then attach the face frames or cabinet sides with screws driven into pilot holes. Tack the cabinets to the wall studs, but don't drive screws too tight—you may need to make adjustments once the entire bank is installed.



Make sure all cabinets are level. If necessary, adjust by driving shims underneath cabinets. Place shims behind the cabinets near stud locations to fill any gaps. Tighten wall screws. Cut off shims with utility knife.



Use trim moldings to cover gaps between the cabinets and the wall or floor. The toe-kick area is often covered with a strip of wood finished to match the cabinets or painted black.



Hang cabinet doors and mount drawer fronts, then test to make sure they close smoothly and the doors fit evenly and flush. Self-closing cabinet hinges (by far the most common type installed today) have adjustment screws that allow you to make minor changes to the hardware to correct any problems.

Creating a Kitchen Island

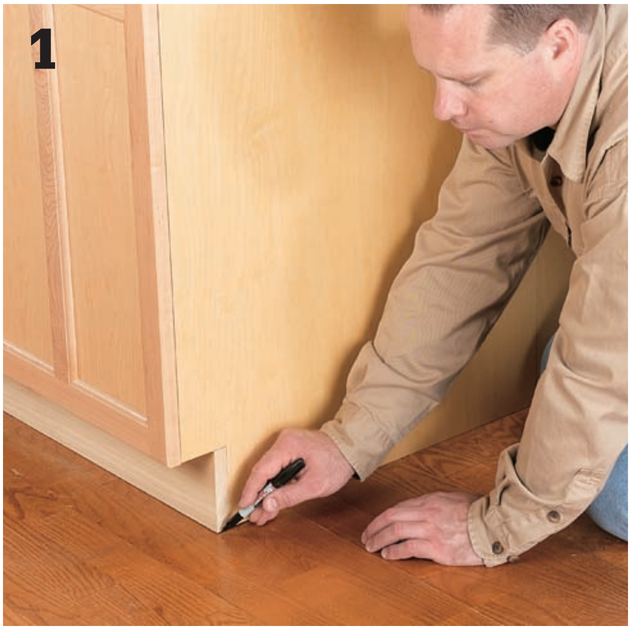
Kitchen islands can be created using a whole range of methods, from repurposing an old table to fine, custom woodworking. But perhaps the easiest (and most failsafe) way to add the conveniences and conviviality of a kitchen island is to make one from stock base cabinets. The cabinets and countertops don't have to match your kitchen cabinetry, but that is certainly an option you should consider. When designing and positioning your new island, be sure to maintain a minimum distance of 3 ft. between the island and other cabinets (4 ft. or more is better).

Tools & Materials ▸

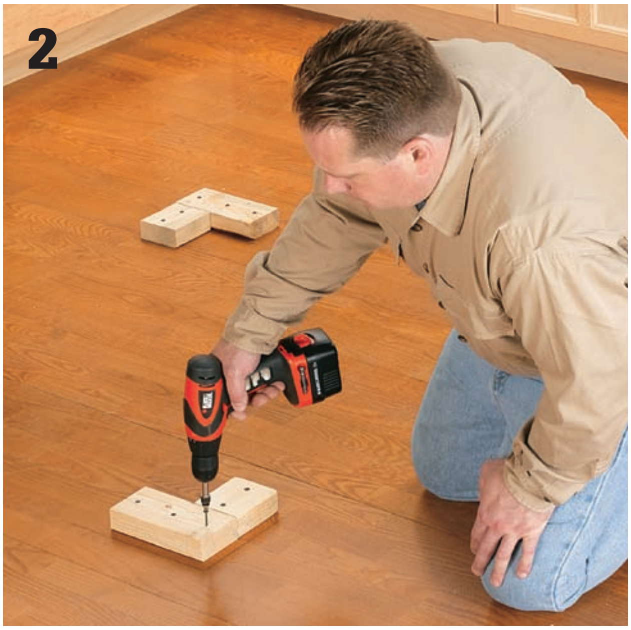
- Marker
- Drill/driver
- 2 × 4 cleats
- Pneumatic nailer and 2" finish nails or hammer and 6d finish nails
- 2 base cabinets (approx. 36" wide × 24" deep)
- Countertop
- Wallboard screws

Two base cabinets arranged back-to-back make a sturdy kitchen island base that's easy to install. When made with the same style cabinets and countertops as the rest of the kitchen, the island is a perfect match.

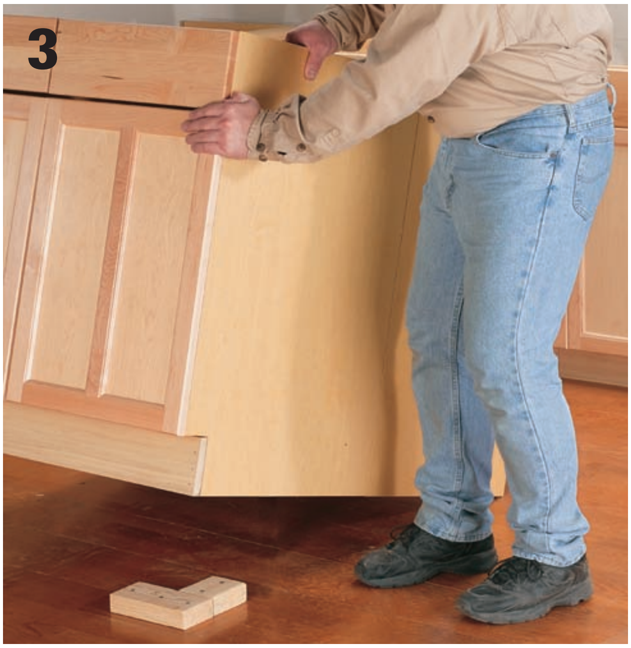
How to Create a Stock-cabinet Island



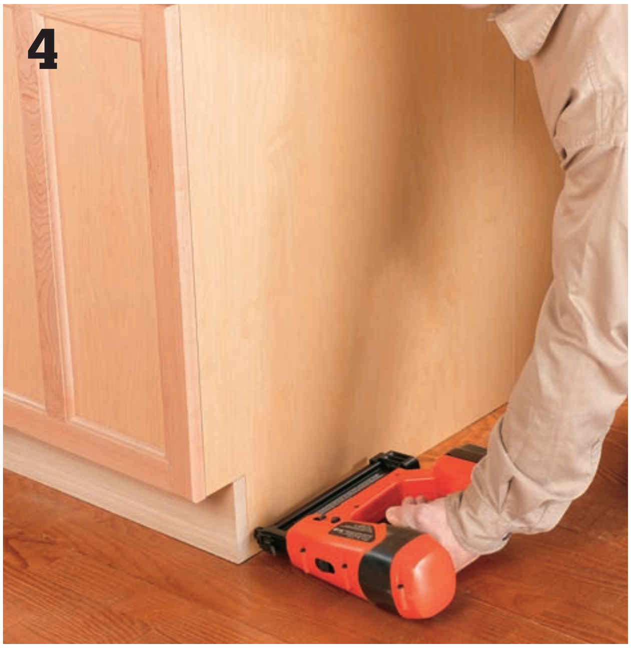
Set two base cabinets back-to-back in position on the floor and outline the cabinet corners onto the flooring. Remove the cabinets and draw a new outline inside the one you just created to allow for the thickness of the cabinet sides (usually ¾").



Cut 2 × 4 cleats to fit inside the inner outline to provide nailing surfaces for the cabinets. Attach the cleats to the floor with screws or nails. TIP: Create an L-shape cleat for each inside corner.



Join the two base cabinets together by driving 1¼" wallboard screws through the nailing strips on the backs of the cabinets from each direction. Make sure the cabinet sides are flush and aligned. Lower the base cabinets over the cleats. Check the cabinets for level, and shim underneath the edges of the base if necessary.



Attach the cabinets to the floor cleats using 6d finish nails. Drill pilot holes for nails, and recess nail heads with a nail set. Make a countertop and install it on top of the cabinets.

Making Countertops

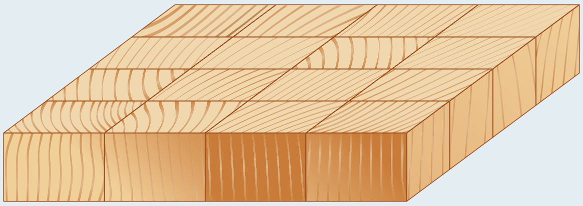
More than simply a work surface, a kitchen countertop is an important part of many built-ins that can dazzle with the look-at-me pizzazz of granite, or bring together a country theme with soapstone and butcher block. There are many choices in countertops, from the less expensive laminate and post-form, through ceramic and stone tile, to high-end stainless-steel, granite and marble.

Countertop options for your built-in depend on how much you are willing to spend, whether you will be doing the work yourself or contracting out, and what look you want to achieve. In this chapter we will cover several countertop options, identifying their pluses and minuses, and giving installation directions for those you can install yourself.

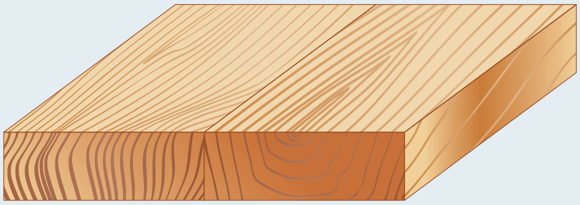
Step-by-step instructions with photographs are included for two countertop projects: post-form laminated, custom laminate.

Butcher Block ▸

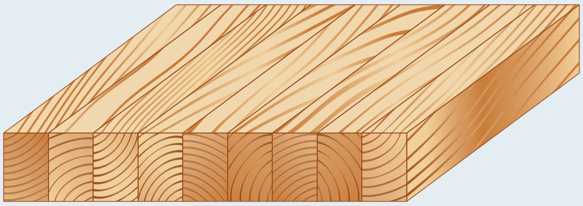
Typical countertop material is 1½" wide and 25" deep, available in a number of lengths from 4 ft. to 12 ft. long.



End grain



Face grain



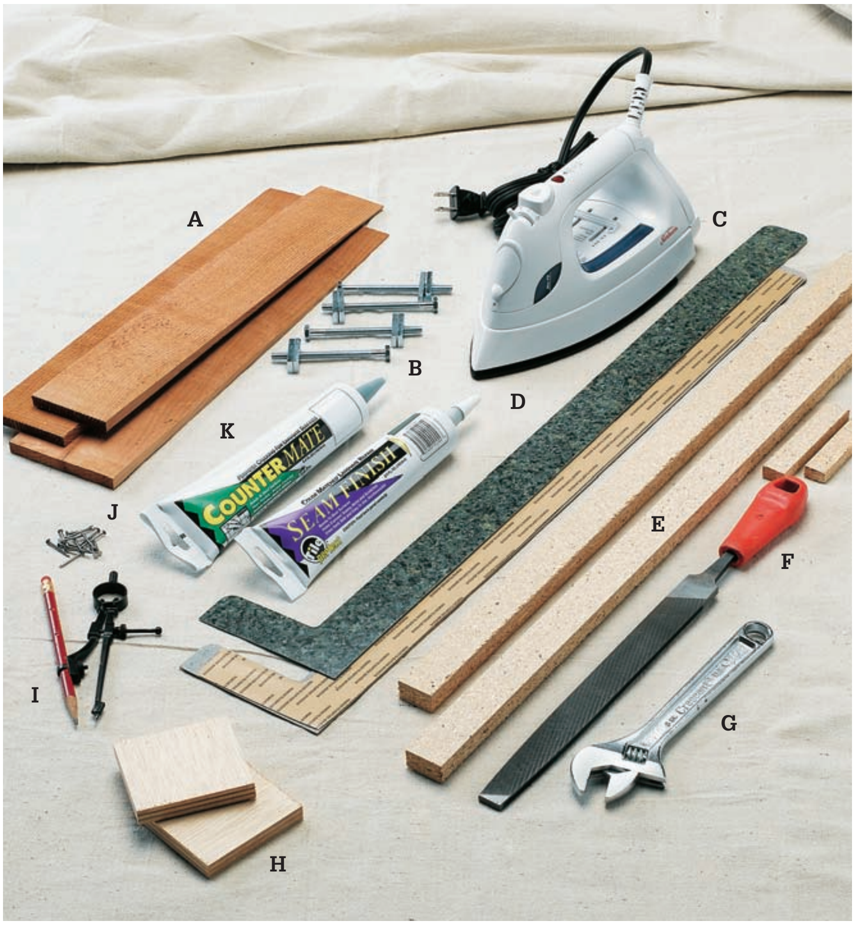
Edge grain

Butcher block that's constructed with the end grain oriented up is the most desirable, but it is relatively hard to find and fairly expensive. Material with the face grain or edge grain facing up is more common and more affordable (prefinished, it still runs around $30 per lineal foot).

A well-chosen countertop can give your built-in a high-end appearance and a professional finish.

Installing a Post-form Countertop

Post-form laminate countertops are available in stock and custom colors. Pre-mitered sections are also available. If the countertop has an exposed end, you will need an endcap kit that contains a preshaped strip of matching laminate. Post-form countertops have either a waterfall edge or a no-drip edge. Stock colors are typically available in 4-, 6-, 8-, 10- and 12-foot straight lengths and 6- and 8-foot mitered lengths.



Materials and tools for installing a post-form countertop include: Wood for shimming (A), take-up bolts for drawing miters together (B), household iron (C), endcap laminate to match countertop (D), endcap battens (E), file (F), adjustable wrench (G), buildup blocks (H), compass (I), fasteners (J), silicone caulk and sealer (K).

Post-form countertops are among the easiest and cheapest to install. They are a good choice for beginning DIYers, but the design and color options are fairly limited.

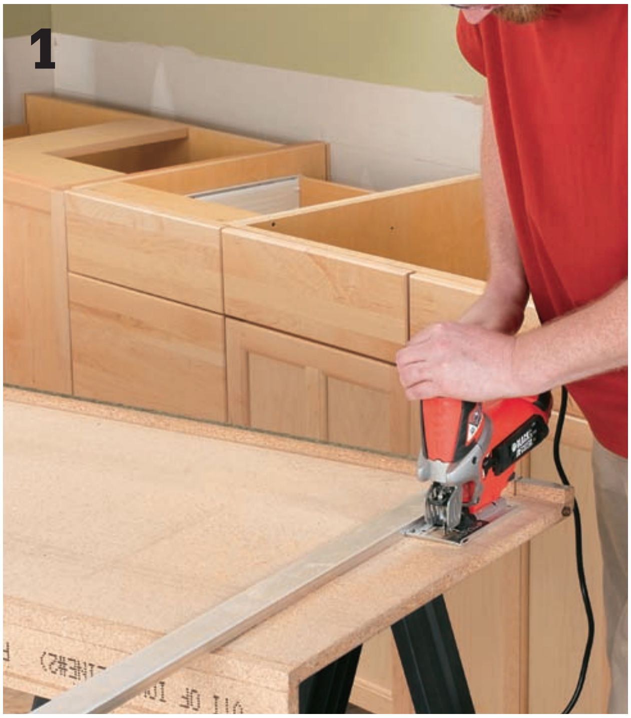
OPTION: Use a jig saw fitted with a downstroke blade to cut post-form if the saw foot must rest on the good surface of the post form. If you are unable to locate a downstroke blade, you can try applying tape over the cutting lines, but you are still likely to get tear-out from a normal upstroke jig saw blade.

Tools & Materials ▸

- Tape measure
- Framing square
- Pencil
- Straightedge
- C-clamps
- Hammer
- Level
- Caulking gun
- Jig saw
- Compass
- Adjustable wrench
- Belt sander
- Drill and spade bit
- Cordless screwdriver
- Post-form countertop
- Wood shims
- Take-up bolts
- Drywall screws
- Wire brads
- Endcap laminate
- Silicone caulk
- Wood glue.

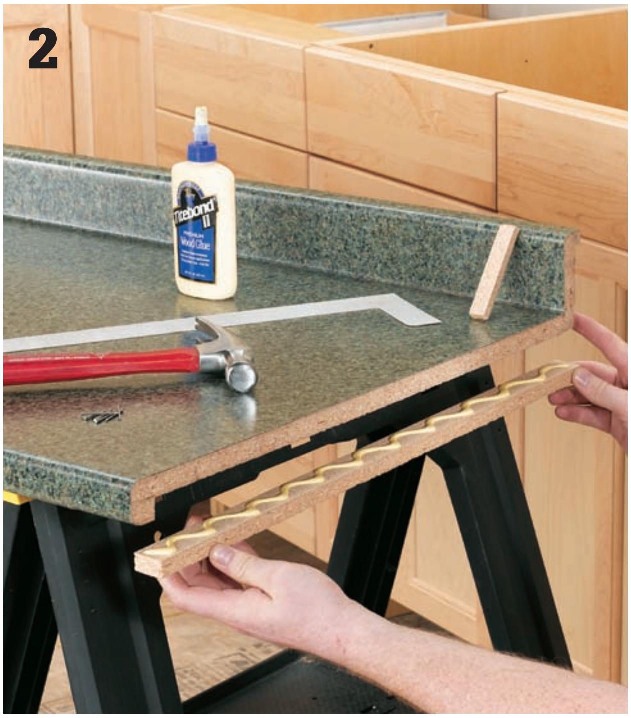
How to Install a Post-form Countertop

1

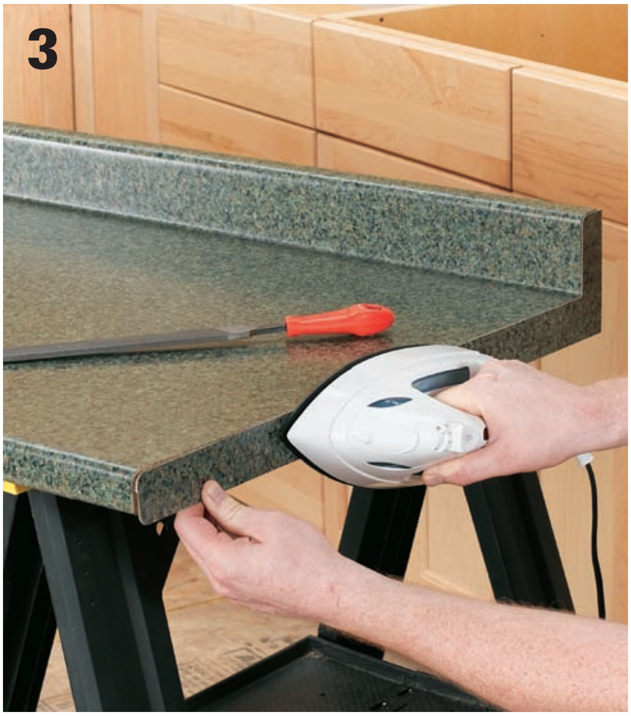


Use a framing square to mark a cutting line on the bottom surface of the countertop. Cut the countertop with a jig saw, using a clamped straight-edge as a guide.

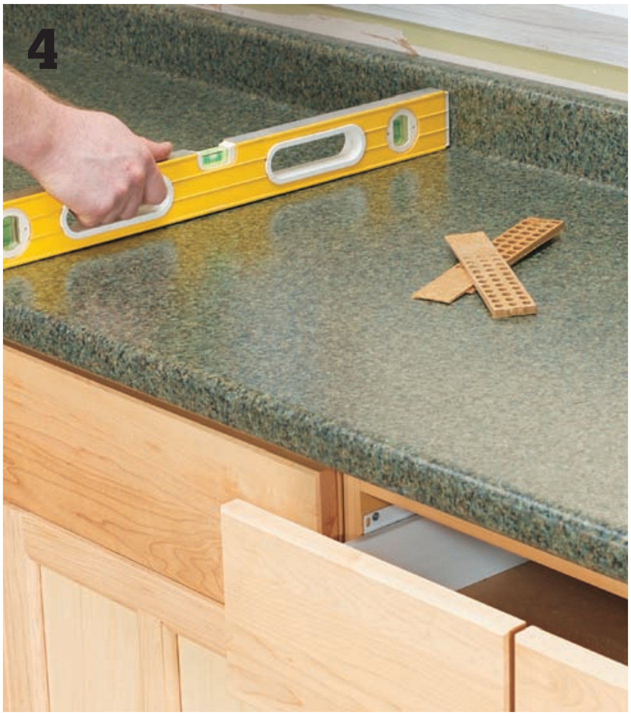
2



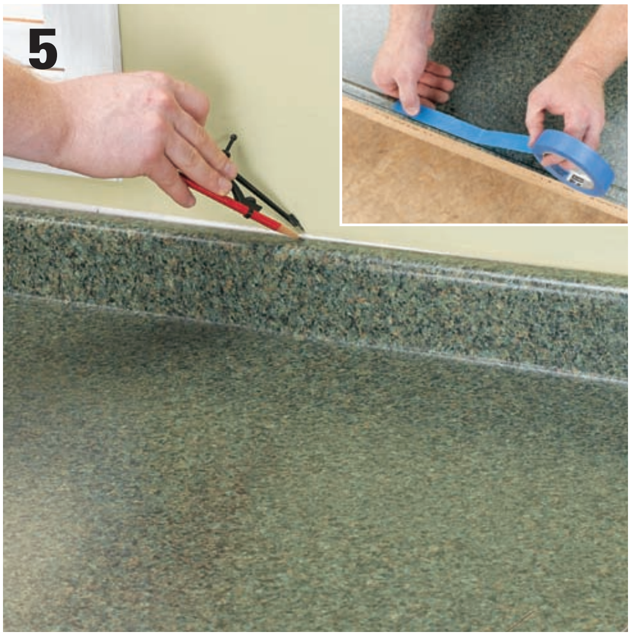
Attach the battens from the endcap kit to the edge of the countertop, using carpenter's glue and small brads. Sand out any unevenness with a belt sander.



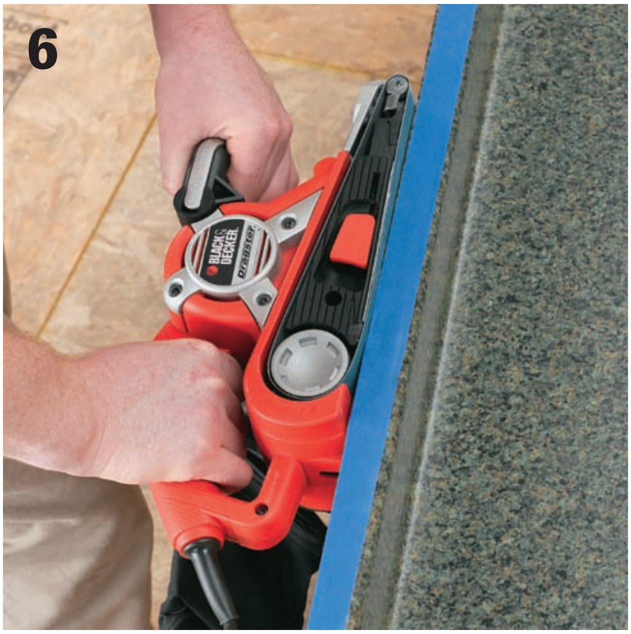
Hold the endcap laminate against the end, slightly overlapping the edges. Activate adhesive by pressing an iron set at medium heat against the endcap. Cool with a wet cloth, then file the endcap laminate flush with the edges of the countertop.



Position the countertop on base cabinets. Make sure the front edge of the countertop is parallel to the cabinet faces. Check the countertop for level. Make sure that drawers and doors open and close freely. If needed, adjust the countertop with shims.

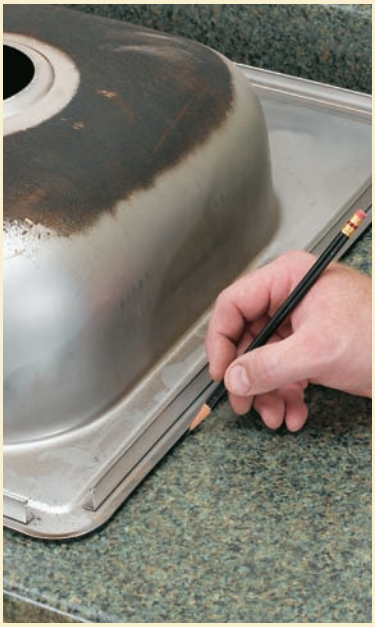


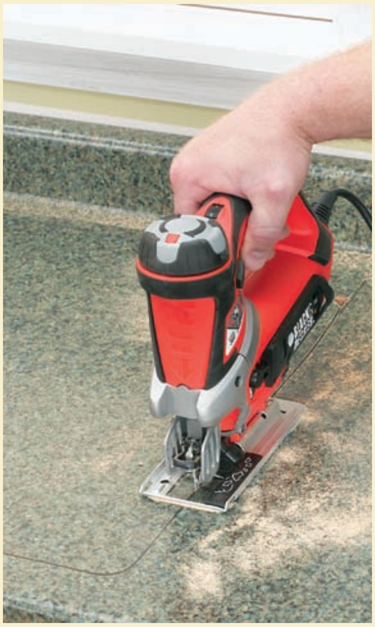
Because walls are usually uneven, use a compass to trace the wall outline onto the backsplash. Set the compass arms to match the widest gap, then move the compass along the length of the wall to transfer the outline to the top of the backsplash. Apply painter's tape to the top edge of the backsplash, following the scribe line (inset).

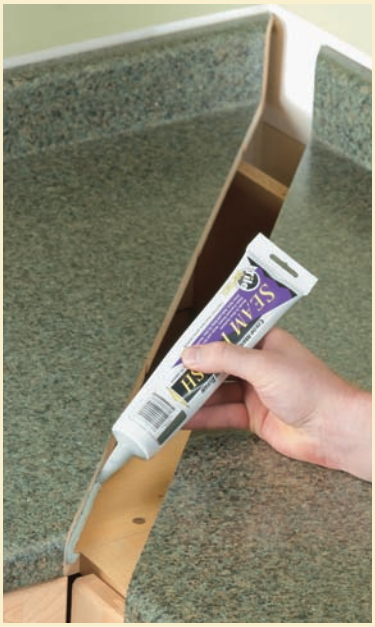


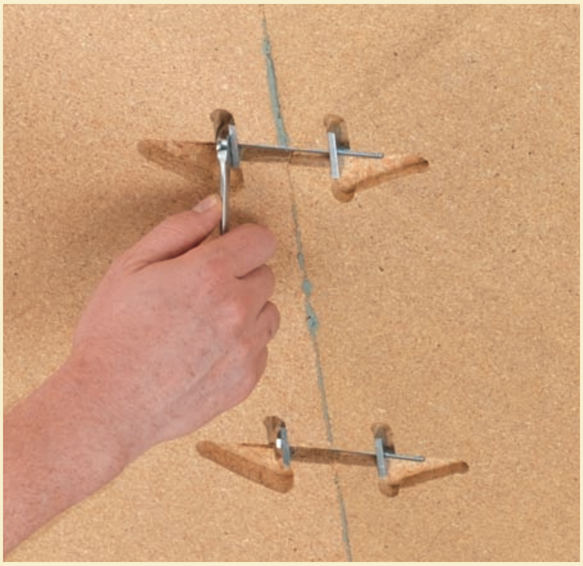
Remove the countertop. Use a belt sander to grind the backsplash to the scribe line. Replace and install the countertop.

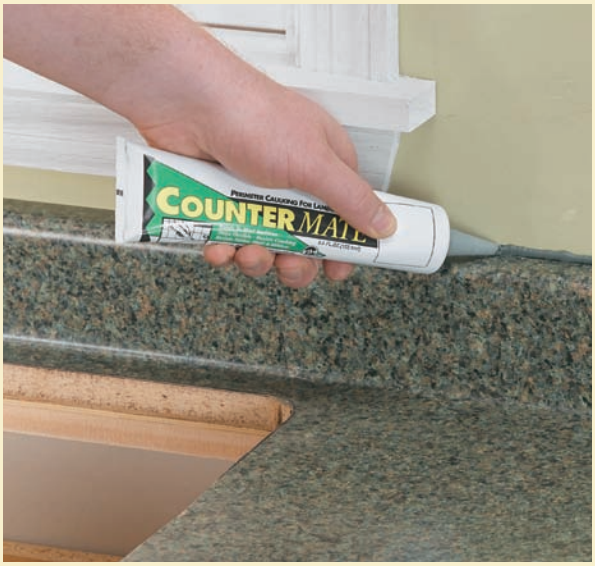
Tips for Installing Post-form Countertops ▸


Mark the cutout for a self-rimming sink by tracing it. Position the sink upside down on the countertop and trace its outline. Remove the sink and draw a cutting line ⅝" inside the sink outline.


Drill a starter hole just inside the cutting line. Make sink cutouts with a jig saw. Support the cutout area from below so that the falling cutout does not damage the cabinet or countertop.


Apply a bead of silicone caulk to the edges of the mitered countertop sections. Force the countertop pieces tightly together.


From underneath the countertop, install and tighten miter take-up bolts. Position the countertop tightly against the wall and fasten it to the cabinets by driving wallboard screws up through corner brackets and into the countertop. Screws should be long enough to provide maximum holding power, but not long enough to puncture the laminate surface.


Seal the seam between the backsplash and the wall with silicone caulk. Smooth the bead with a wet fingertip. Wipe away excess caulk.

Building a Custom Laminate Countertop

Building your own custom laminate countertop using sheets of plastic laminate and particleboard offers two advantages: the countertop you get will be less expensive than a custom-ordered countertop, and it will allow you more options in terms of colors and edge treatments. A countertop made with laminates also can be tailored to fit any space, unlike premade countertop material that is a standard width (usually 25").

Laminate commonly is sold in 8-ft. or 12-ft. lengths that are about 1⁄20" thick. In width, they range from 30" strips to 48" sheets. The 30" strips are sized specifically for countertops, allowing for a 25"-wide countertop, a 1½" wide front edge strip and a short backsplash.

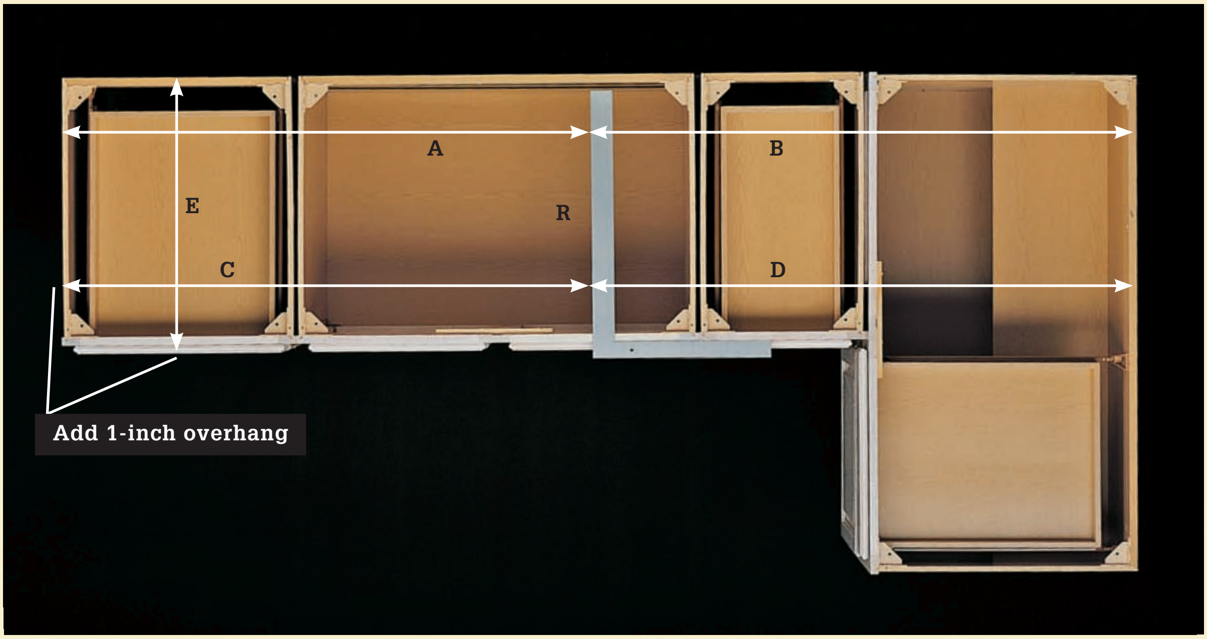
The plastic laminate is bonded to the particleboard or MDF substrate with contact cement (although most professional installers use adhesives that are available only to the trades). Water-base contact cement is nonflammable and nontoxic, but solvent-base contact cement (which requires a respirator and is highly flammable) creates a much stronger, more durable bond.

Tools & Materials ▸

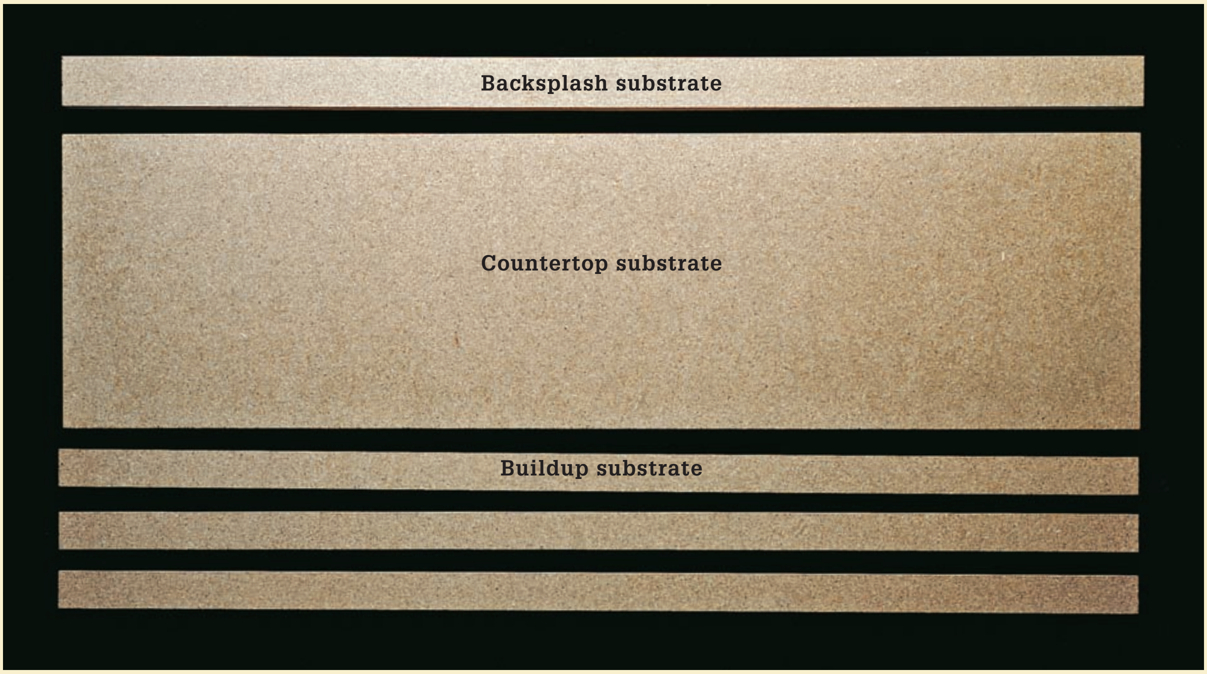
Tape measure
Framing square
Straightedge
Scoring tool
Paint roller
3-way clamps
Caulk gun
J-roller
Miter saw
Scribing compass
Circular saw
Screwdriver
Belt sander
File
Router
¾" particleboard
Sheet laminate
Contact cement and thinner
Wood glue
Drywall screws.

Fabricating your own custom countertop from particleboard and plastic laminate is not exactly an easy DIY project, but it gives you unlimited options and the results can be very satisfying.

Tips for Working with Laminate ▸

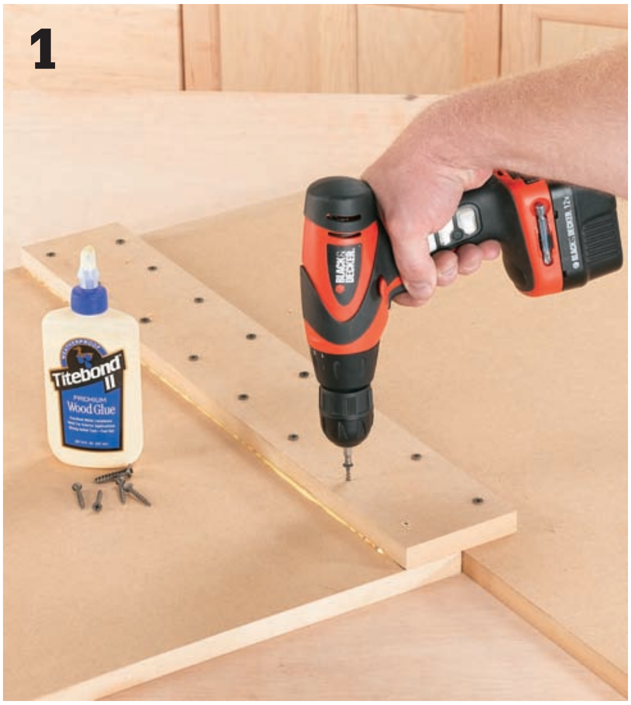


Measure along tops of base cabinets to determine the size of the countertop. If wall corners are not square, use a framing square to establish a reference line (R) near the middle of the base cabinets, perpendicular to the front of the cabinets. Take four measurements (A, B, C, D) from the reference line to the cabinet ends. Allow for overhangs by adding 1" to the length for each exposed end, and 1" to the width (E).

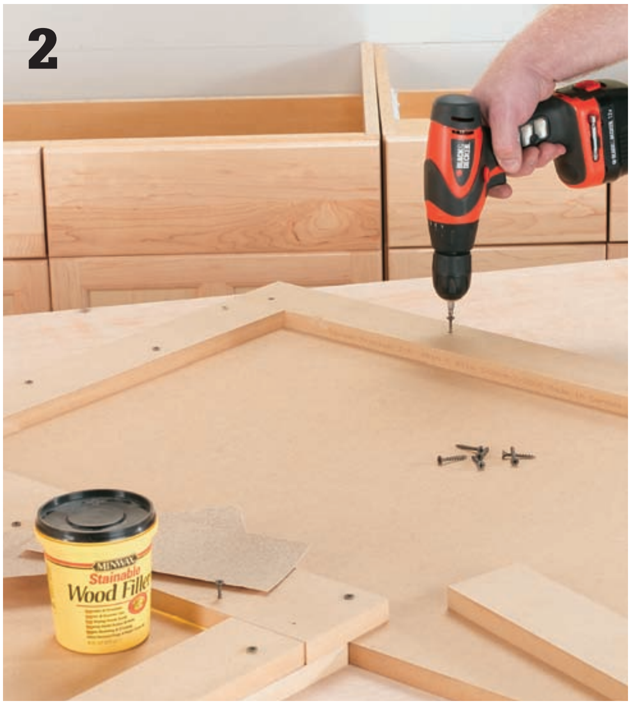


Lay out cutting lines on the particleboard so you can rip-cut the substrate and build-up strips to size, using a framing square to establish a reference line. Cut core to size using a circular saw with clamped straightedge as a guide. Cut 4" strips of particleboard for the backsplash, and for joint support where sections of countertop core are butted together. Cut 3" strips for edge buildups.

How to Build a Custom Laminate Countertop

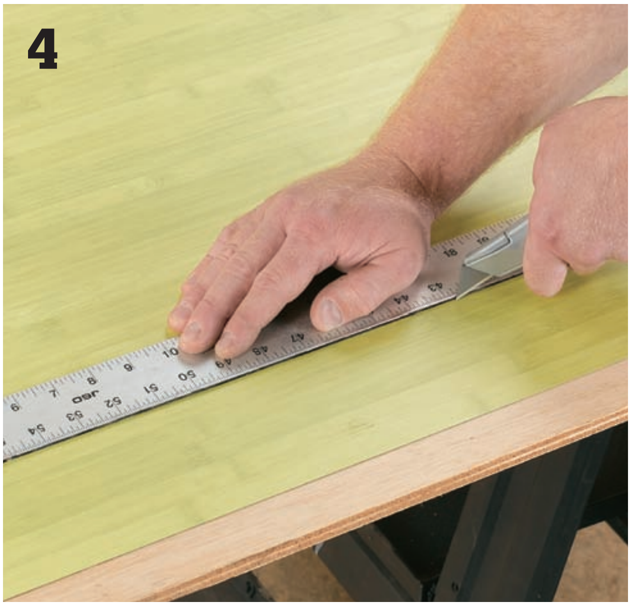


Join the countertop substrate pieces on the bottom side. Attach a 4" particleboard joint support across the seam, using carpenter's glue and 1¼" wallboard screws.

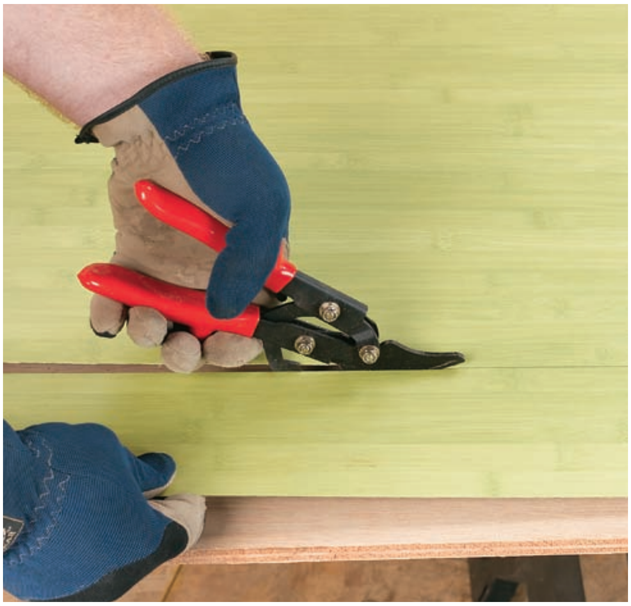


Attach 3"-wide edge buildup strips to the bottom of the countertop, using 1¼" wallboard screws. Fill any gaps on the outside edges with latex wood patch, and then sand the edges with a belt sander.

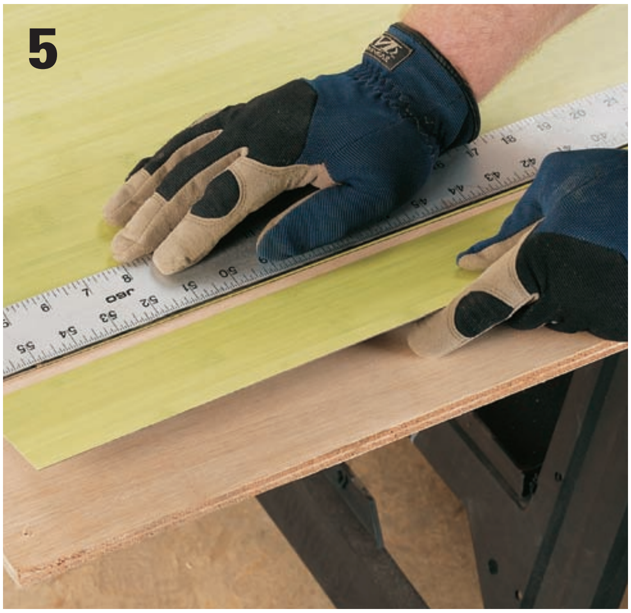
To determine the size of the laminate top, measure the countertop substrate. Laminate seams should not overlap the substrate. Add ½" trimming margin to both the length and width of each piece. Measure laminate needed for face and edges of backsplash, and for exposed edges of countertop substrate. Add ½" to each measurement.



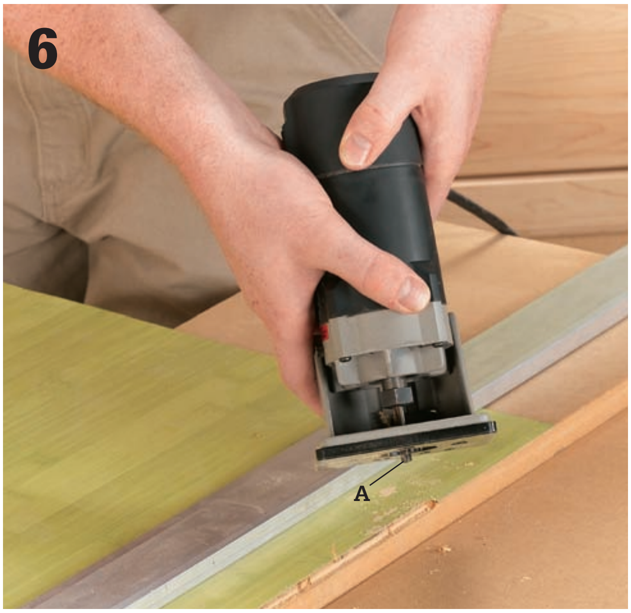
Cut laminate by scoring and breaking it. Draw a cutting line, then etch along the line with a utility knife or other sharp cutting tool. Use a straightedge as a guide. Two passes of scoring tool will help laminate break cleanly.



OPTION: Some laminate installers prefer to cut laminate with special snips that resemble avaiator snips. Available from laminate suppliers, the snips are faster than scoring and snapping, and less likely to cause cracks or tears in the material. You'll still need to square the cut edges with a trimmer or router.

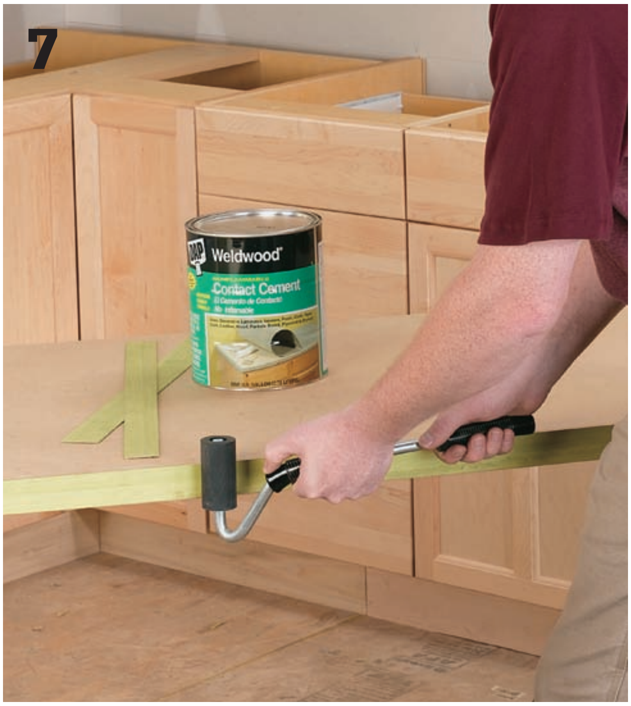


Bend laminate toward the scored line until the sheet breaks cleanly. For better control on narrow pieces, clamp a straightedge along the scored line before bending laminate. Wear gloves to avoid being cut by sharp edges.



Create tight-piloted seams with plastic laminate by using a router and a straight bit to trim edges that will butt together. Measure from cutting edge of the bit to edge of the router baseplate (A). Place laminate on scrap wood and align edges. To guide the router, clamp a straightedge on the laminate at distance A plus ¼", parallel to laminate edge. Trim laminate.

7

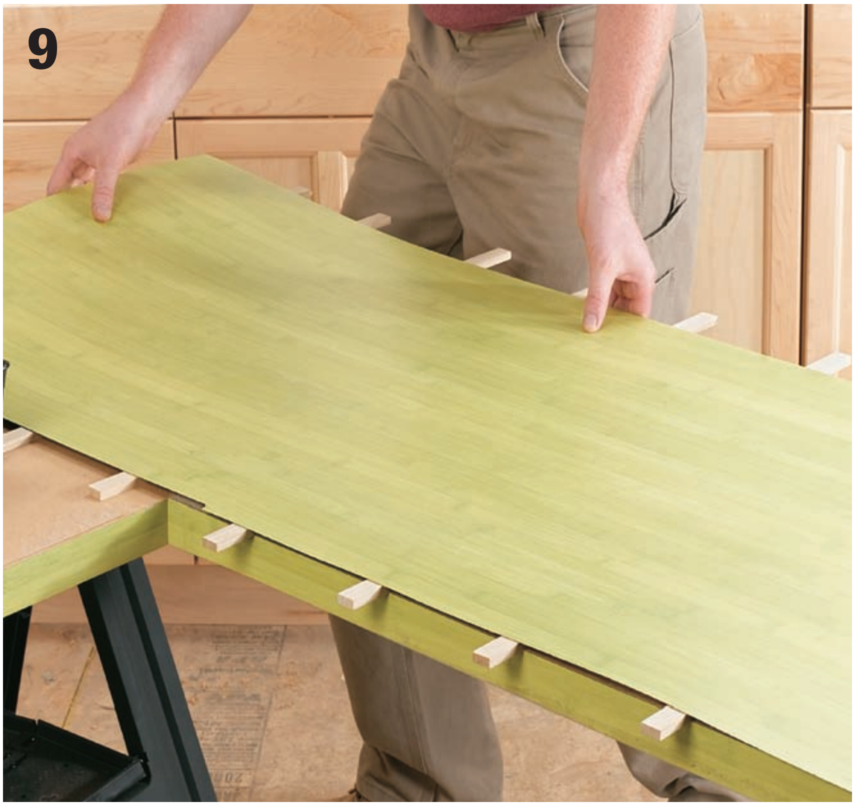


Apply laminate to sides of countertop first. Using a paint roller, apply two coats of contact cement to the edge of the countertop and one coat to back of laminate. Let cement dry according to manufacturer's directions. Position laminate carefully, then press against edge of countertop. Bond by rolling with a J-roller.

8

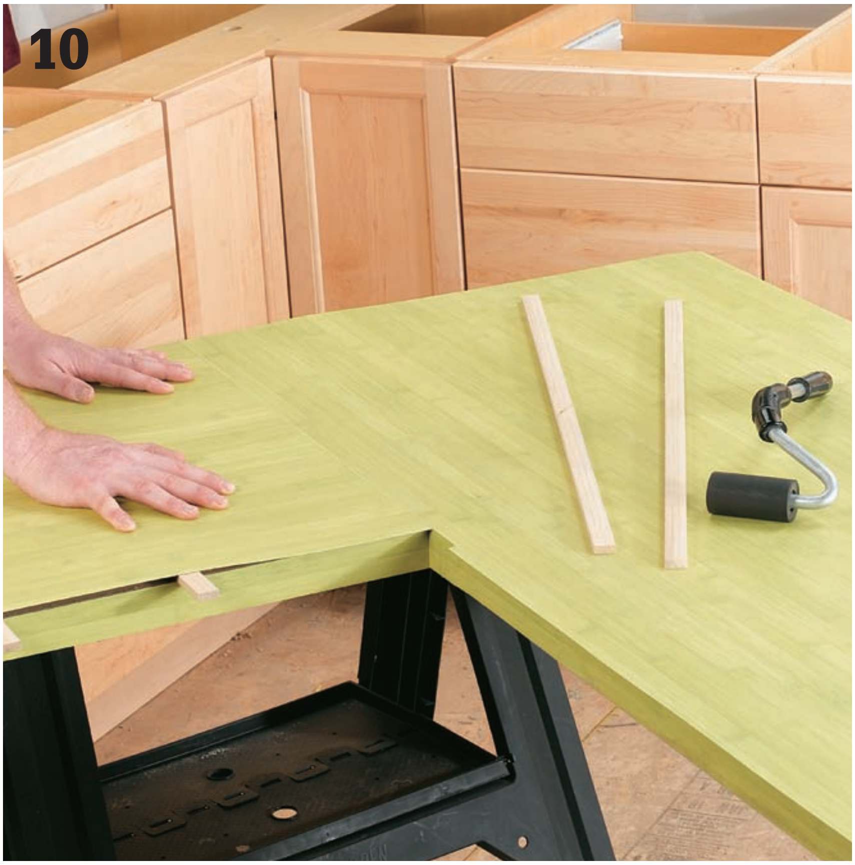
Use a router and flush-cutting bit to trim edge strip flush with top and bottom surfaces of countertop substrate. At edges where router cannot reach, trim excess laminate with a file. Apply laminate to remaining edges, and trim with router.

9



Test-fit laminate top on countertop substrate. Check that laminate overhangs all edges. At seam locations, draw a reference line on core where laminate edges will butt together. Remove laminate. Make sure all surfaces are free of dust, then apply one coat of contact cement to back of laminate and two coats to substrate. Place spacers made of ¼"-thick scrap wood at 6" intervals across countertop core. Because contact cement bonds instantly, spacers allow laminate to be positioned accurately over core without bonding. Align laminate with seam reference line. Beginning at one end, remove spacers and press laminate to countertop core.

10

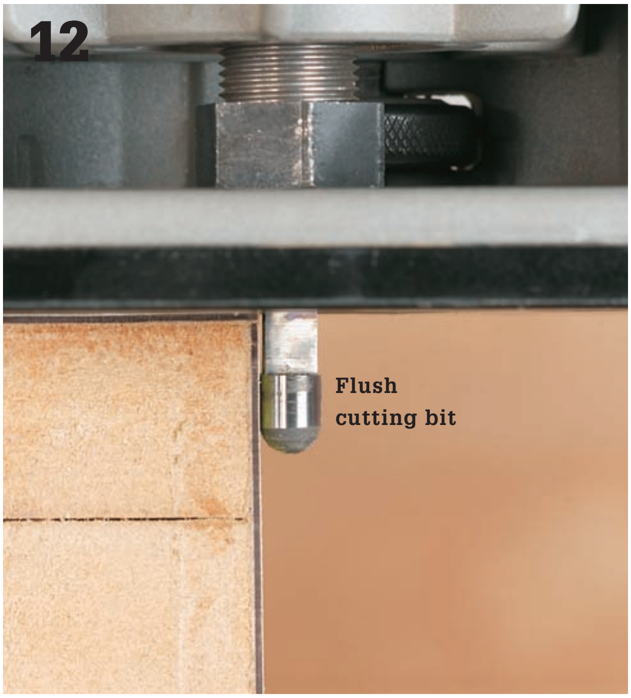


Apply contact cement to remaining substrate and next piece of laminate. Let the cement dry, then position laminate on spacers, and carefully align the butt seam. Beginning at seam edge, remove spacers and press laminate to the countertop substrate.

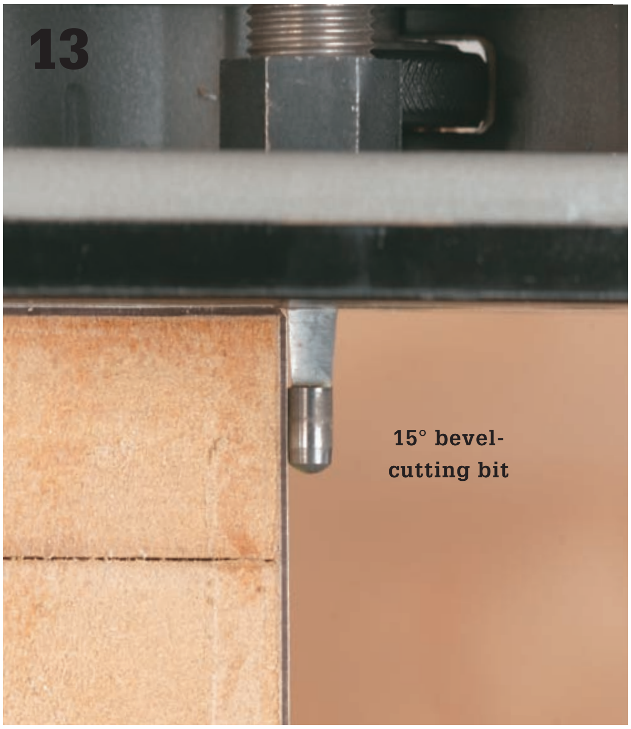
11

Roll the entire surface with a J-roller to bond the laminate to the substrate. Clean off any excess contact cement with a soft cloth and mineral spirits.

12



Remove excess laminate with a router and flush-cutting bit. At edges where router cannot reach, trim excess laminate with a file. Countertop is now ready for final trimming with bevel-cutting bit.

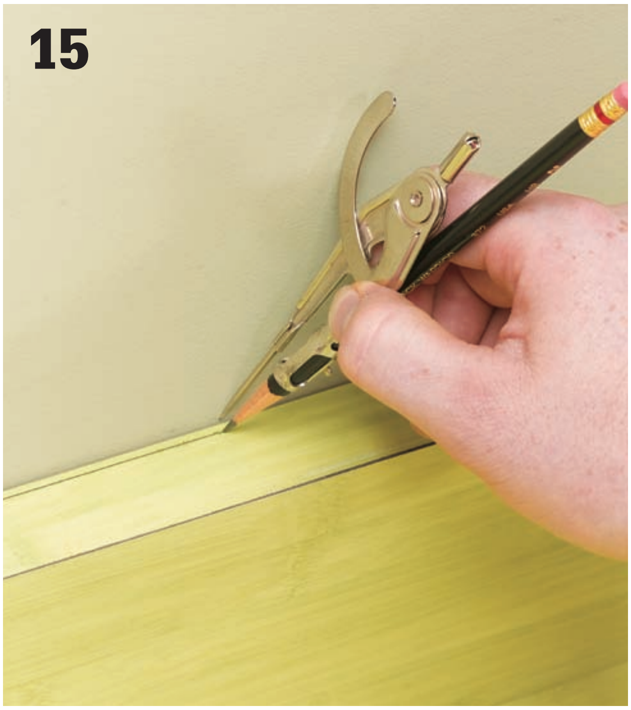


Finish-trim the edges with router and 15° bevel-cutting bit. Set bit depth so that the bevel edge is cut only on top laminate layer. Bit should not cut into vertical edge surface.

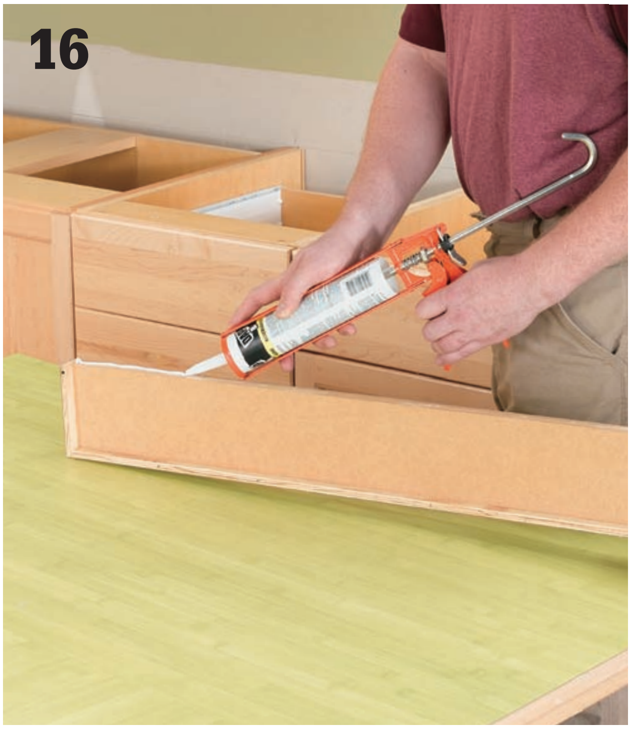
Odorless Mineral Spirits

TIP: File all edges smooth. Use downward file strokes to avoid chipping the laminate.

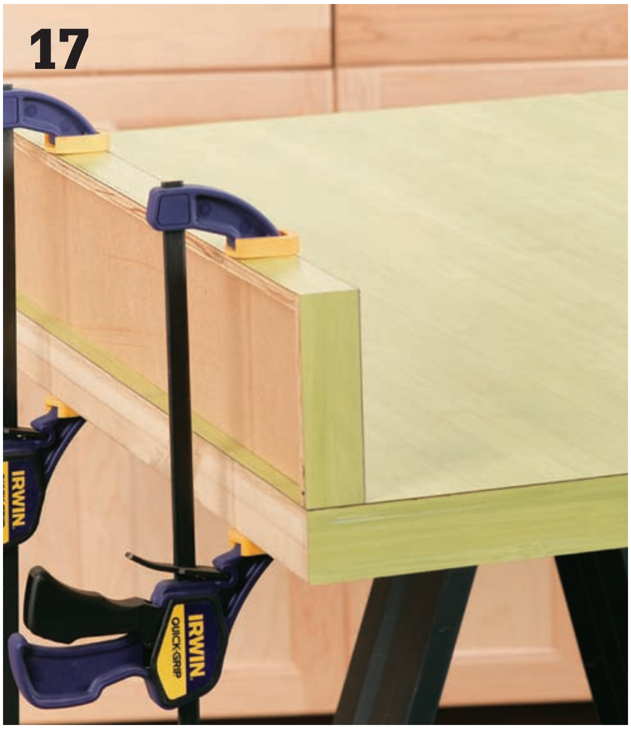
Cut 1¼"-wide strips of ¼" plywood to form an overhanging scribing strip for the backsplash. Attach to the top and sides of the backsplash substrate with glue and wallboard screws. Cut laminate pieces and apply to exposed sides, top and front of backsplash. Trim each piece as it is applied.



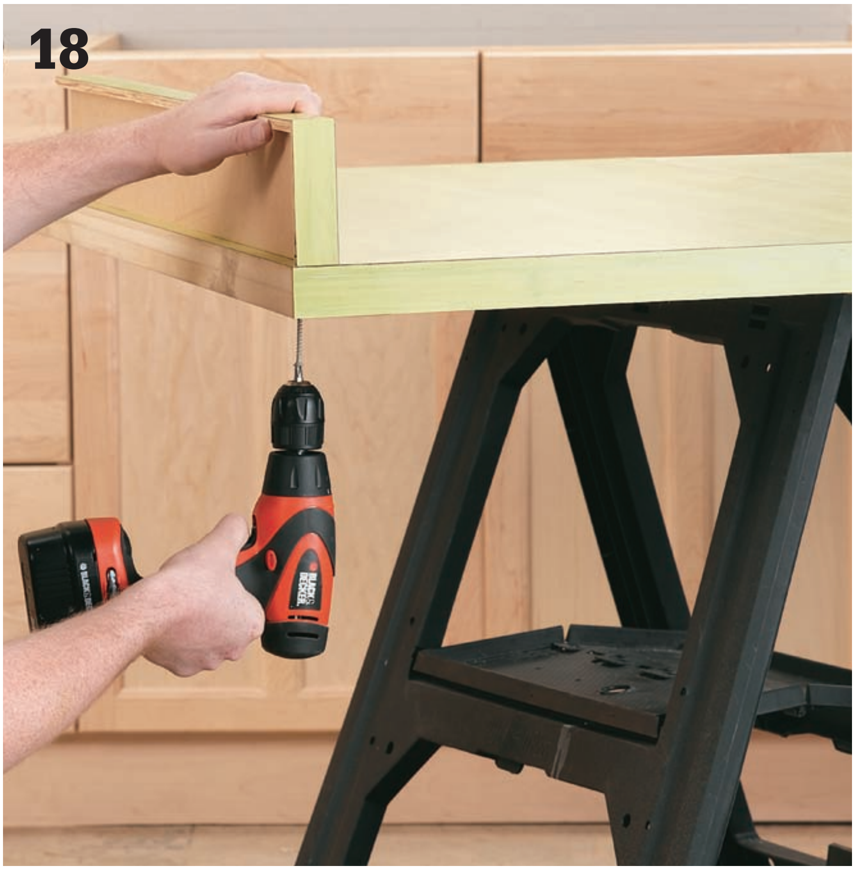
Test-fit the countertop and backsplash. Because your walls may be uneven, use a compass to trace the wall outline onto the backsplash scribing strip. Use a belt sander to grind the backsplash to scribe line.



Apply a bead of silicone caulk to the bottom edge of the backsplash.



Position the backsplash on the countertop, and clamp it into place with bar clamps. Wipe away excess caulk, and let dry completely.



Screw 2" wallboard screws through the countertop and into the backsplash core. Make sure screw heads are countersunk completely for a tight fit against the base cabinet. Install countertops.

Creating Wood Countertop Edges

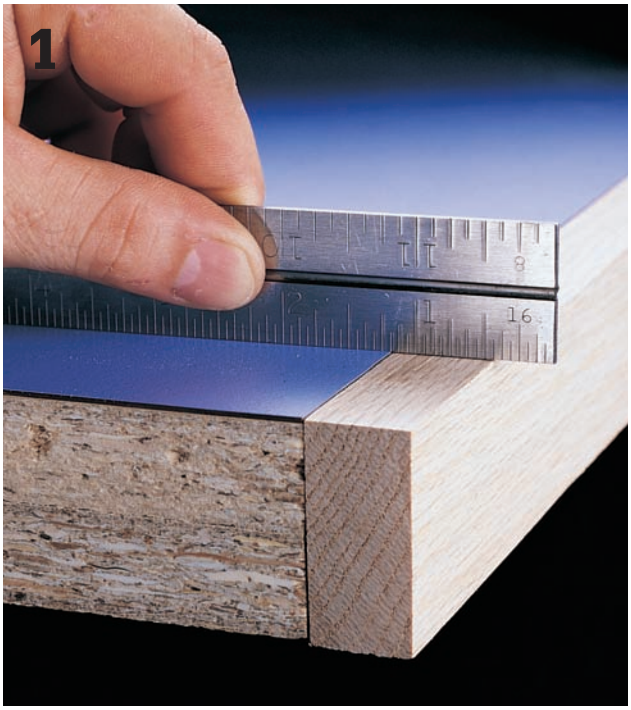
For an elegant added touch on a laminate countertop, use hardwood edges and shape them with a router. Rout the edges before attaching the backsplash to the countertop. Wood caps can also be added to the top edge of the backsplash. A simple edge is best for easy cleaning.

Tools & Materials ▸

- Hammer
- Nail set
- Belt sander with 120-grit sanding belt
- 3-way clamps
- Router
- 1 × 2 hardwood strips
- Wood glue
- Finish nails

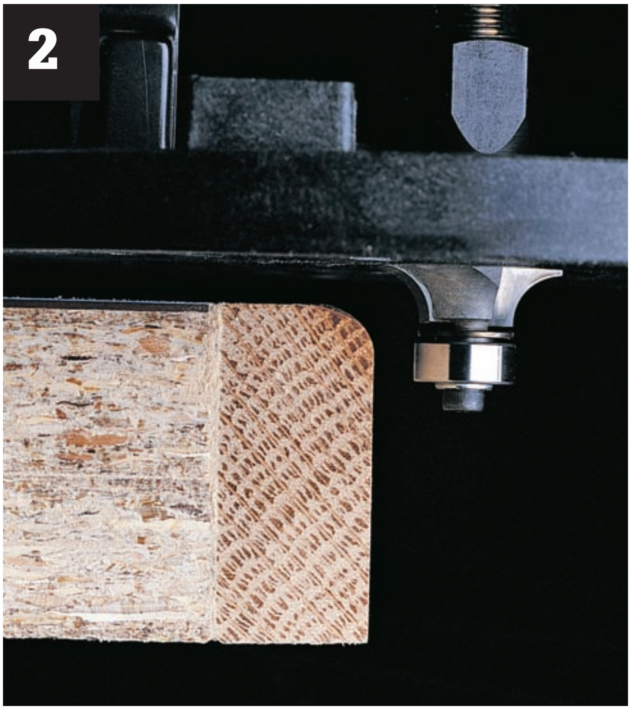
Incorporating hardwood into the countertop edging presents a wealth of attractive and very durable solutions for the nosing of a plastic laminate countertop.

How to Build Solid Hardwood Edges



1

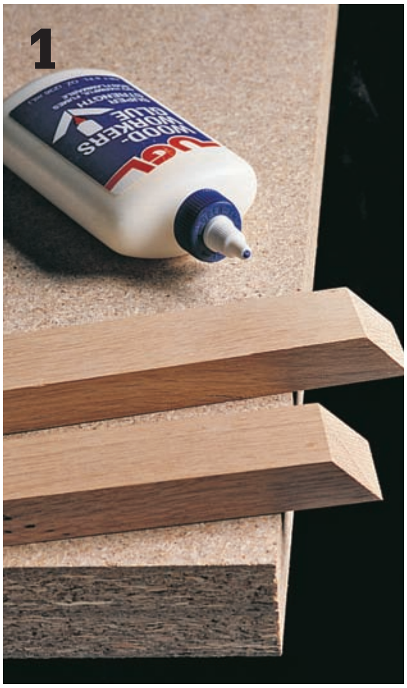
Apply laminate to the top of the countertop before attaching the edge strip. Attach the edge strip flush with the surface of the laminate, using wood glue and finish nails.



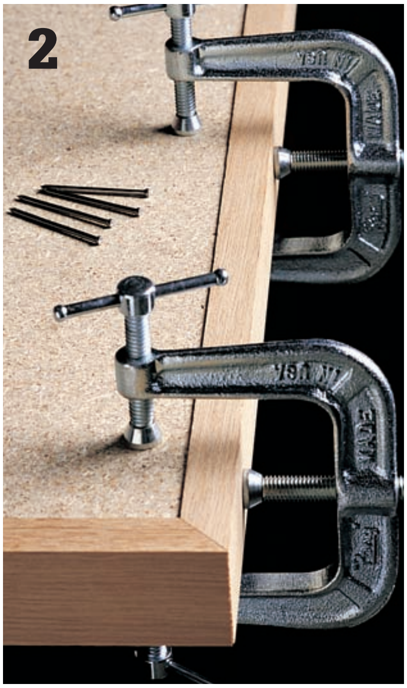
2

Mold the top and bottom edges of the strip with a router and profiling bit, if desired. Stain and finish the wood as desired.

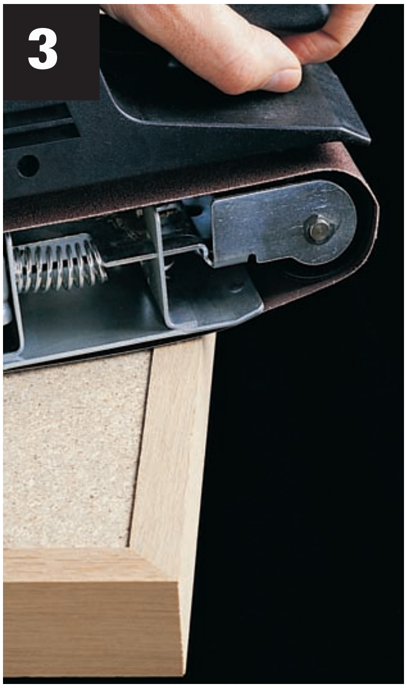
How to Build Coved Hardwood Edges



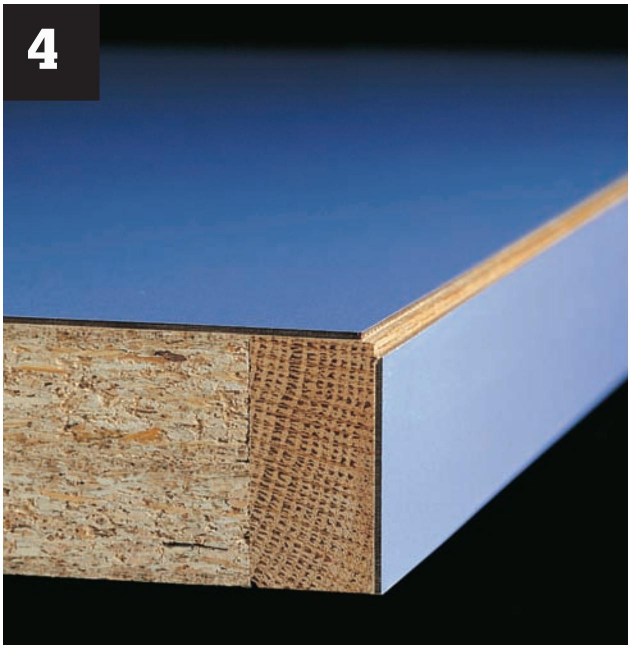
Cut 1 × 2 hardwood strips to fit the edges of the countertop. Sand the strips smooth. Miter-cut the inside and outside corners.



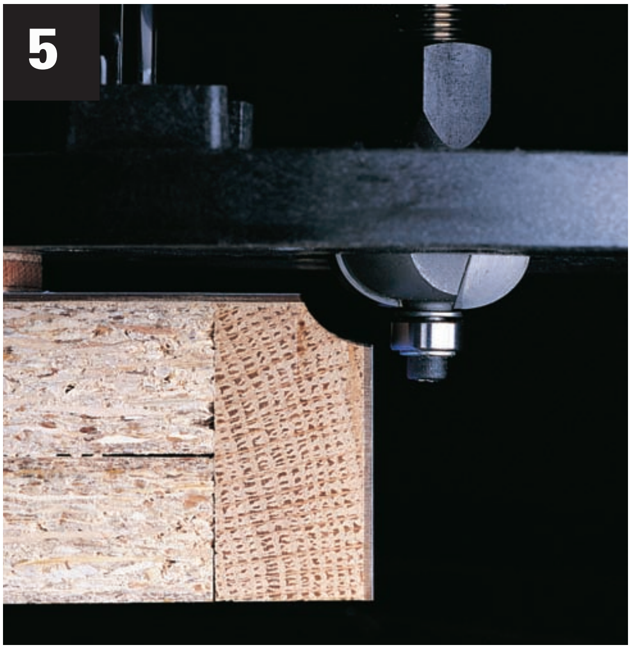
Attach edge strips to the countertop with wood glue and 3-way clamps. Drill pilot holes, then attach strip with finish nails. Recess nail heads with a nail set or, use a pneumatic finish nailer with 2" nails.



Sand the edge strips flush with the top surface of the countertop, using a belt sander and 120-grit sandpaper.



Apply laminate to the edge and top of the countertop after the hardwood edge has been sanded flush.



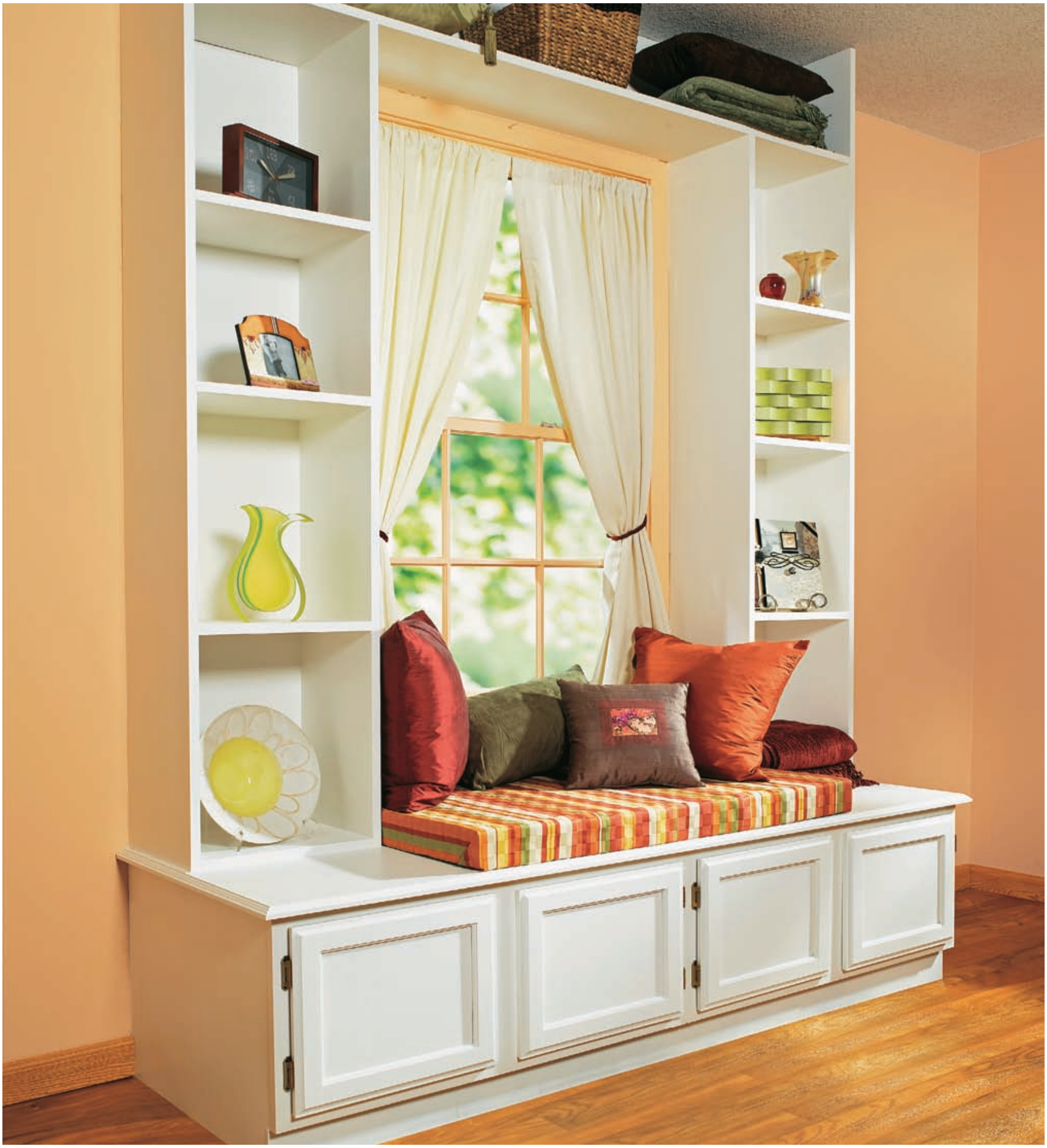
Cut cove edge with a router and cove bit with ball-bearing pilot. Smooth cove with 220-grit sandpaper. Stain and finish exposed wood as desired.

BUILT-IN PROJECTS

Window Seat

One great way to add cozy charm to a room is to build a window seat. Not only do window seats make a room more inviting, they provide functional benefits as well, particularly when you surround them with built-in shelving. The window seat shown here has a base built from above-the-refrigerator cabinets. This size provides just the right height (when placed on a 3" curb) to create a comfortable seat.

Above the cabinets and flanking each side is a site-made bookcase. A top shelf bridges the two cases and ties the whole thing together—while creating still more space for storage or display.

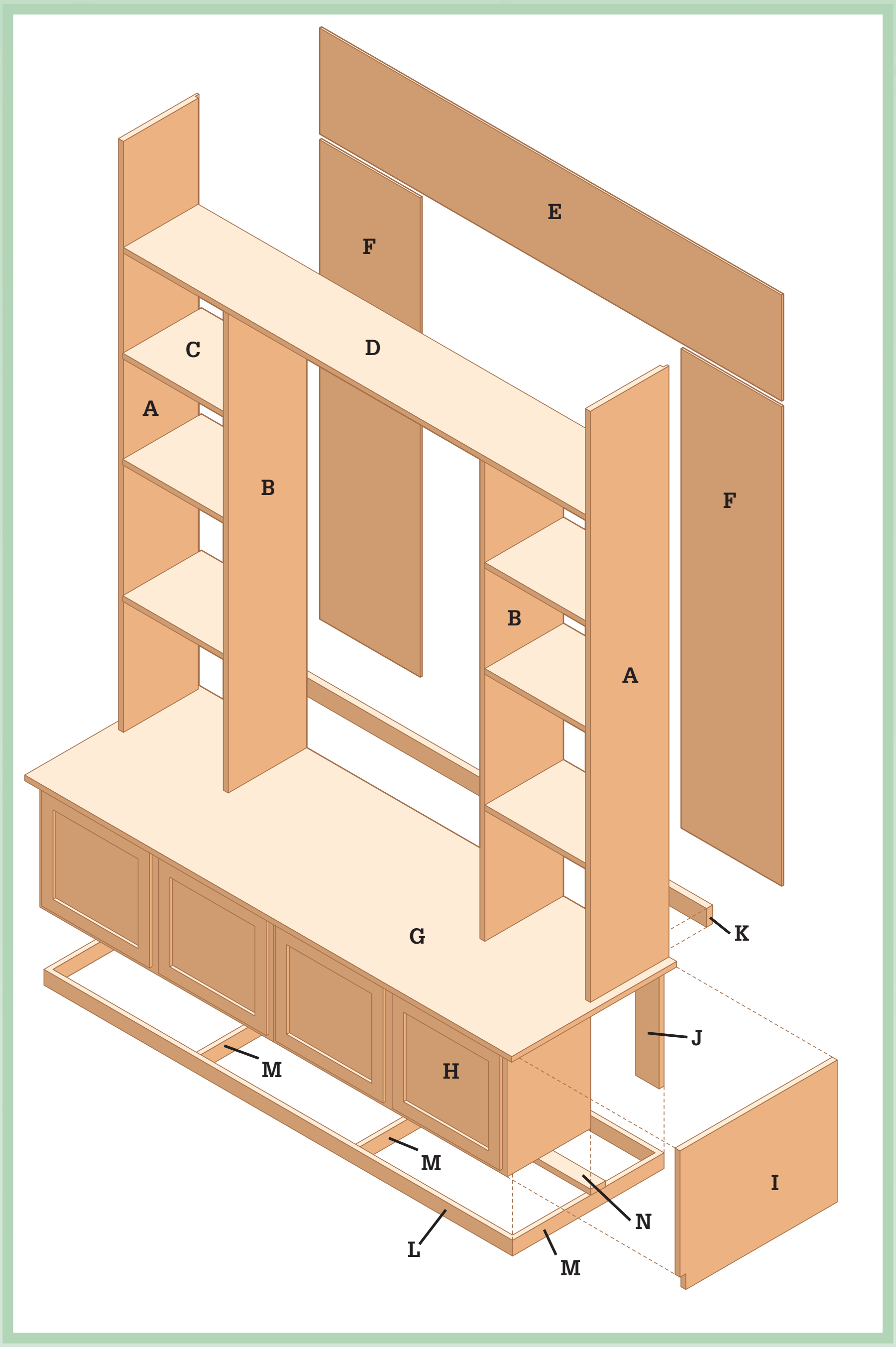


Tools

- Miter saw
- Table saw
- Circular saw
- Drill/driver
- Level
- Stud finder
- Hammer
- Tape measure
- Nail set
- Pneumatic nailer/compressor
- Router
- Shooting board
- Sander
- Framing square

Materials

- 2) 15" upper refrigerator cabinets
- 2) ¾" × 4 × 8 ft. pcs. MDF or plywood
- Screws/nails
- 1) ¼" × 4 × 8 ft. lauan plywood
- Caulk
- Primer
- Paint

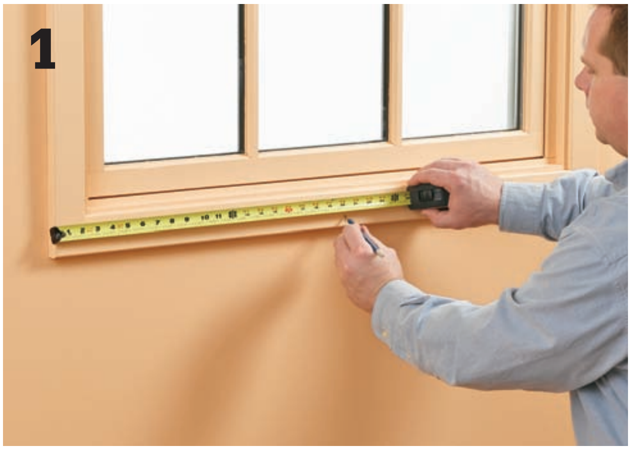


Cutting List

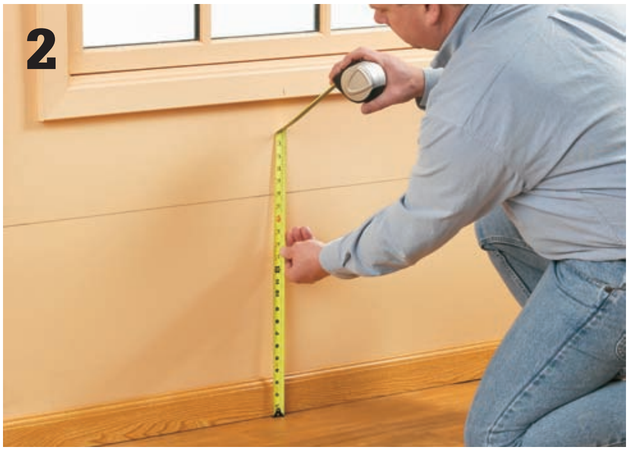
Part	No.	Desc.	Size	Material
A	2	Outer standard	¾ × 11½ × 77¼"	MDF
B	2	Inner standard	¾ × 11½ × 63¼"	MDF
C	6	Shelf	¾ × 16½ × 11¼"	MDF
D	1	Top shelf	¾ × 11¼ × 70½"	MDF
E	1	Top backer	¼ × 13¼ × 71⅜"	Plywood
F	2	Backers	¼ × 17½ × 63¼"	Plywood
G	1	Seatboard	¾ × 25 × 74"	MDF

Part	No.	Desc.	Size	Material
H	2	Bridge cabinets	15 h × 36" w	Stock cabinets
I	2	End panel	¾ × 24 × 18"	MDF
J	4	Nailer	¾ × 2½ × 15"	Plywood
K	1	Ledger	¾ × 2½ × 72"	Plywood
L	2	Curb rim	¾ × 3 × 72"	MDF
M	4	Curb strut	¾ × 3 × 22½"	MDF
N	1	Cabinet nailer	¾ × 3 × 72"	MDF

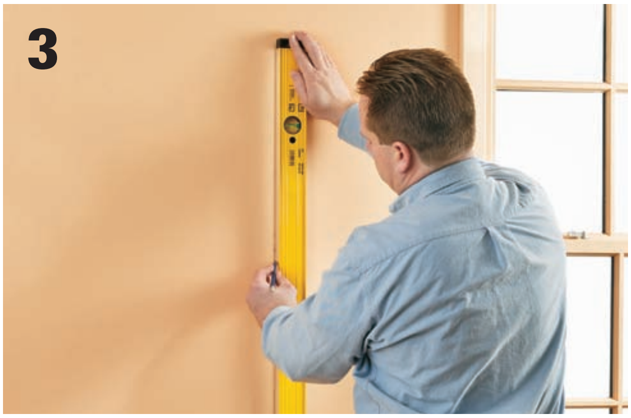
How to Build a Window Seat



The key control point for laying this project out is the center of the window sill. Measure and mark it.



After striking a level line at cabinet height, measure from the floor in three locations to make sure the cabinets will fit.



Strike a plumb line on each edge of the cabinet run. Use a 4-foot level and strike the line from floor to ceiling.

LAY OUT THE PROJECT

This window seat is integrated with the existing window and trimwork. The key control point for laying out the base cabinets is locating the center of the window opening. It is also important that the cabinets sit level both left-to-right and front-to-back. Level cabinet tops make installing the upper cabinet cases much easier.

Before you begin building, relocate or remove any electrical outlets that'll be covered by the cabinet, according to your local electrical codes. For example, you can't just dead-end wires and leave them buried in a wall. They usually need to be capped and placed in a junction box with a removable faceplate that is accessible (which may mean making a cutout in the back of a cabinet panel).

Mark the center of the window opening on the sill (photo 1). Use a square and a level to transfer that mark plumb down the wall to the cabinet height location. At the height of the cabinets mark a level line. Measure from the floor up to the level line in several locations to make sure the cabinets will fit all along their entire run (photo 2). If they don't fit, make the proper adjustments; that is, raise the line. Cabinets that don't come up to the line must be shimmed so they are level. Using an electronic stud finder, find and mark the wall stud locations beneath the window and on each side in the project area. *Note: You should find jack and king studs directly on either side of the window and a header above the window. Determine the overall span of the cabinets you choose. For the project shown here, the bank will be 6 ft. long, measuring from outside-edge to outside-edge. Use a level to mark the outside edges of the cabinet run on the wall. Mark plumb lines down to the floor and up to the ceiling (photo 3).*

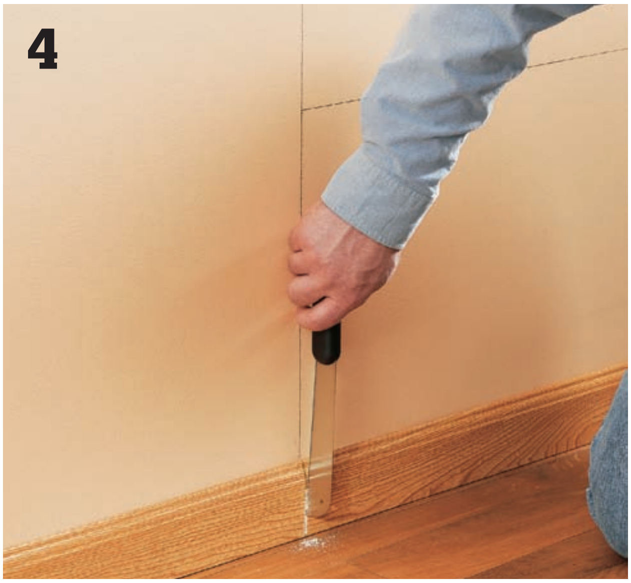
INSTALL THE BASE CABINETS

With all the layout lines marked out, the next step is to install the cabinets that form the base of the window seat. This determines the control points for the rest of the project layout. Use a pull-saw and sharp chisel to remove base molding between the vertical layout lines (photo 4).

To elevate the cabinets that will be used for the seat to a more comfortable height, and to create a toe-kick space, build a short curb that matches the footprint of the seat. Since the curb will not be visible, you can use just about any shop scraps you may have to build it. The one shown here is made with MDF sheet stock that is rip-cut into 3"-wide strips. Then the curb is assembled into a ladder shape by attaching struts between the front and back curb members with glue and screws (photo 5). Once the ladder is built, set the cabinets on the curb so the cabinet fronts and sides align with the curb. Mark the location of the backs of the cabinets onto the top of the curb and then remove the cabinets. Attach a nailer to the curb just behind the line for the cabinet backs. Then, position the curb tight against the wall in the area where the base molding has been removed. Attach it to the sill plate of the wall with nails or screws.

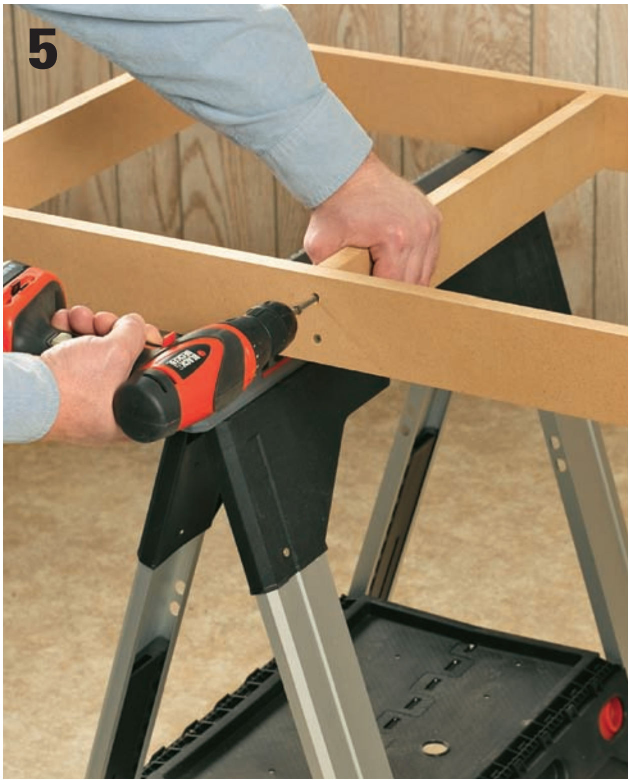
To support the back edge of the seatboard, attach a ledger to the wall. The top of the ledger (we used a 2½"-wide strip of plywood) should be flush with the tops of the cabinets when they are installed on top of the curb. Attach the ledger with panel adhesive and nails or screws driven at stud locations (photo 6). Measure between the top of the curb and ledger and cut a few nailers to this length.

4



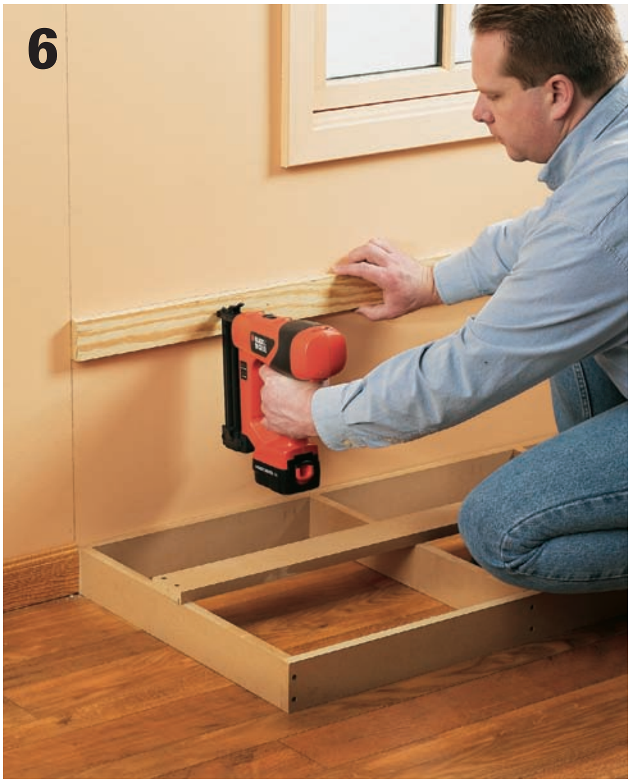
Because a pull-type saw requires almost zero clearance at the bottom of a cut (where it would hit the floor in this application), it's great for removing the base molding so the cabinet carcases fit tight to the wall.

5

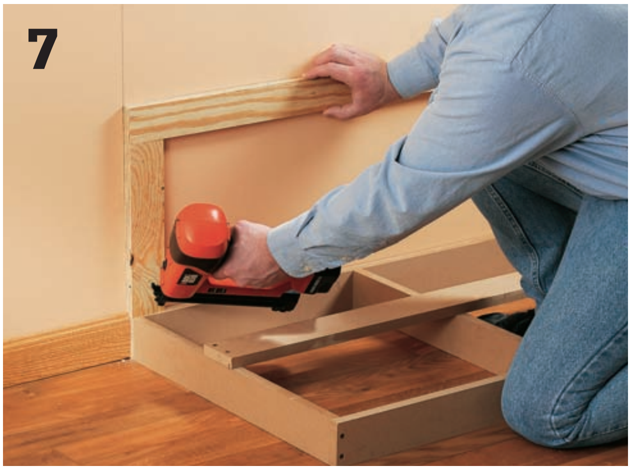


Assemble the curb members into a ladder-like frame and secure the butt joints with glue and screws driven through pilot holes.

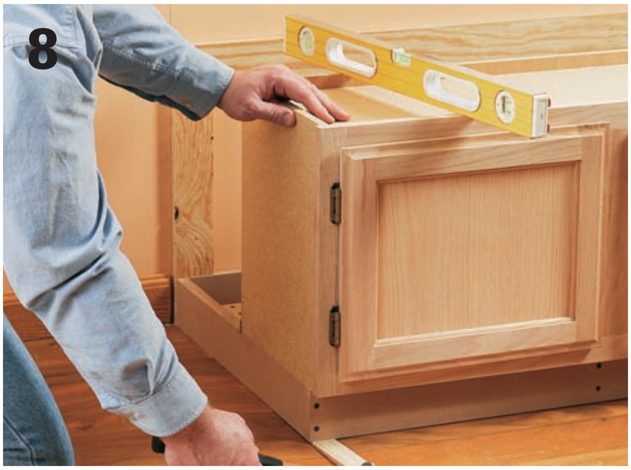
6



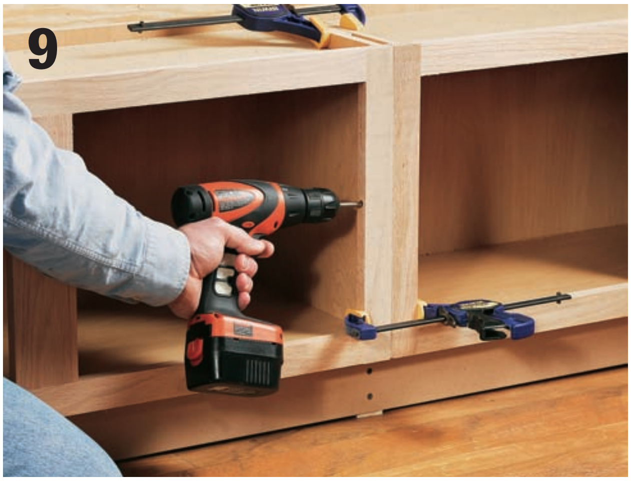
Attach a ledger for the back edge of the seatboard to the wall, using panel adhesive and screws or nails driven at stud locations.



Cut nailers to fit between the ledger and the curb and attach them to the wall at the ends of the project area.



For floors that are out of level, shim the cabinets up to the level line to keep them in a level plane.



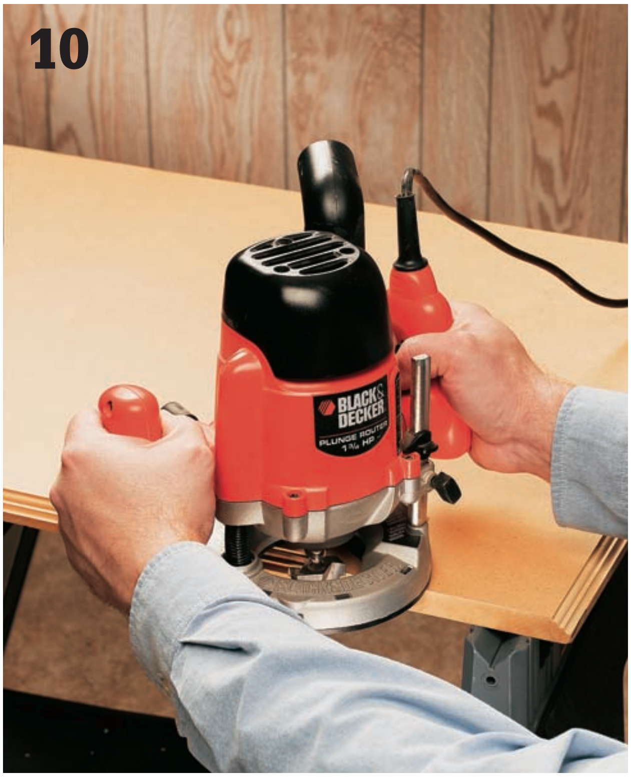
After clamping the cabinet face-frames together, pre-drill and fasten them together with screws.

Attach them to the wall at the ends of the project, and add a couple near the center to help support the ledger (photo 7).

Set the cabinets in position on the curb, with the back edges against the nailer. Drive shims between the curb and the floor if necessary to level the cabinets (photo 8). Fasten the cabinets to the nailer strip. Pre-drill, countersink and face-fasten the face frames together with screws to form a "gang" of cabinets (photo 9). If you are using cabinets that have no face frames, screw the cabinet sides together as directed by the cabinet manufacturer. Cut off shims as necessary.

If the ends of your window seat are open (that is, they don't butt up against a wall), cut end panels to cover the ends of the cabinets and the open space behind them. Use ¼" plywood or hardboard. You may need to remove a sliver of the baseboard on each side so you can butt the panels up against the wall. Attach the panel to the cabinet ends and the curb with panel adhesive.

Cut, rout and install the seat top. Cutting a 74" × 25" blank from MDF (medium-density fiberboard) works well. This will create a one inch overhang at the front and sides of the cabinets.



Before installing the seat top, rout a profile on the front and side edges. Don't rout the back.

Use a router and bit with a decorative profile (such as an ogee or a plain roundover) to smooth the hard edge of the MDF (photo 10). Profiling the edge reduces the chance that the edge will chip or crack. Position the seat top on top of the cabinets and the wall ledger and fasten it from the interior of the cabinets using coarse-threaded drywall screws. A bead of panel adhesive along the top edges of the cabinet and the ledger helps ensure a solid connection.

CUT THE CASE STOCK

The bookcase portion of the window seat can be assembled from sheet stock (MDF is a good choice) or solid 1× stock, such as 1 × 12 pine or poplar (pine is cheaper, poplar is stronger and takes paint better) or hardwood like maple, oak, or cherry for staining. Whatever material you choose, install a backer sheet of ¼" plywood that fits into rabbets in the backs of the case stock to help ensure square assembly and provide a strong connection point to the wall.

The actual width of 1 × 12 dimension lumber is 11½", so if using sheet stock, rip all pieces to width. Any edges that face the interior of the room need to be sanded smooth to remove saw marks. Note that it's usually easier to dress the factory edge than the edge cut on-site. Running the pieces on a jointer or router table is a fast, accurate way to dress the edge. A belt sander or finish sander with fine grit paper works too, but be careful not to remove too much stock. Of course, you can also hand sand it.

Cut a ½" wide by ¼" deep rabbet (see drawing, page 81) on the backs of the standards (photo 11). You can do this with a table saw (either make multiple passes on the table saw to remove stock or use a stacked dado head cutter blade); using a router with a rabbeting bit; or on a jointer or router table. The remainder of the layout and sizing must be registered from the seat top to accommodate specific site conditions.

INSTALL THE TOP-SHELF BACKER

The remaining measurements for the backer and shelf dimensions are now determined by the distance between your window casing, vertical layout lines, and ceiling height. They must be site-measured for accuracy.

Lay out the top shelf backer (photo 12). It should fit between the ceiling and the top of the window casing—and between your vertical layout lines. To calculate the top shelf backer dimensions, measure between the vertical layout lines. Subtract ⅝". To calculate top shelf backer height, measure from the top of the window casing to the ceiling. Subtract ⅛".

11

BLACK & DECKER
PLUNGE ROUTER
2 HP

Clamp all work securely before milling the ½ × ¼ rabbet, for the backers with a router, which will provide safe, accurate cuts. The remainder of the layout and sizing must be registered from the seat top to accommodate specific site conditions.

12

Use the layout lines to size the top shelf backer and the backers for the vertical shelf units.

13

Marking layout lines all at once using a framing square is a good way to keep lines parallel from shelf-to-shelf. Make sure all bottoms are held flush during the marking procedure.

14

Install the rest of the shelves taking care to drive fasteners straight to prevent blow-outs in the shelf stock.

Install the top shelf backer tight to the ceiling by fastening to studs with finish nails or screws.

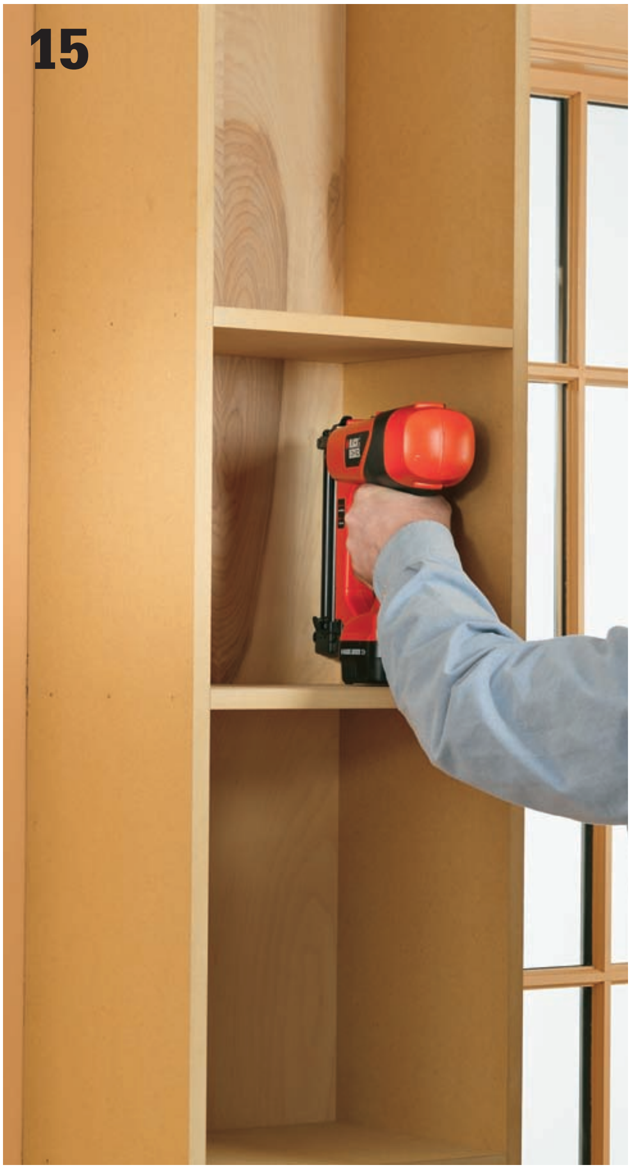
FABRICATE & ASSEMBLE THE BOOKCASES

The bookcases' outside edges run from the seat-top to the ceiling. The inside edges run from the seat-top to the top of the window casing. Measure and cut each vertical bookcase member to length. On a flat surface, lay all the bottoms of the bookcase members flush and mark out your shelves (photo 13). Use a framing square to mark them. Keep in mind there is a bottom shelf that sits directly above the seat top. The top shelf is installed later.

Lay out and cut the backer stock. To calculate the width, measure the distance between the window casing and the vertical layout line, minus ½". To calculate the height, measure the distance from the seat top to the bottom edge of the top backer and subtract ⅛".

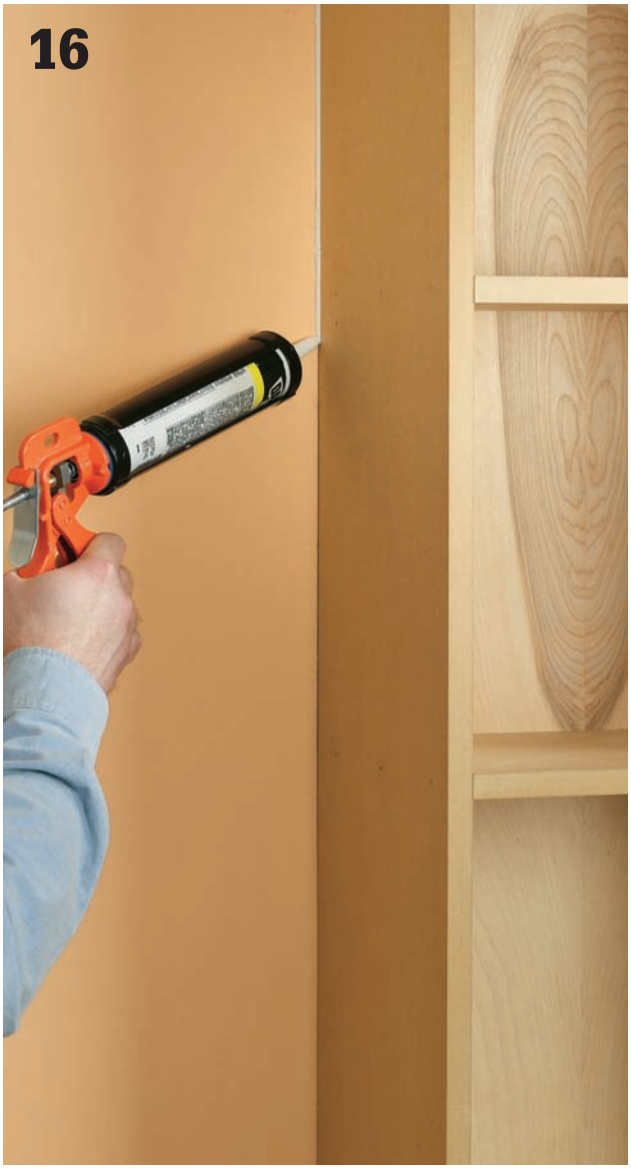
Assemble the cabinet sides and the backers. This is an ideal application for a pneumatic ¼" crown stapler, but it can also be done effectively by pre-drilling and

15



Hold the shelf assembly as tight as possible to the window trim, seat top and wall then fasten.

16



For paint grade units, caulk any gaps that appear to make shadow lines disappear. You can caulk the gap on paint grade shelves too. Be extra diligent in wiping down the material after caulking.

screwing, or by using a pneumatic finish nailer. Use a framing square as a reference to be sure the cabinet carcases are as square as possible during assembly. Measure, cut, and install shelves at the layout lines (photo 14). Fasten through the cabinet carcass into the shelves. Pre-drill and countersink if using screws.

INSTALL THE BOOK CASES & TOP SHELF

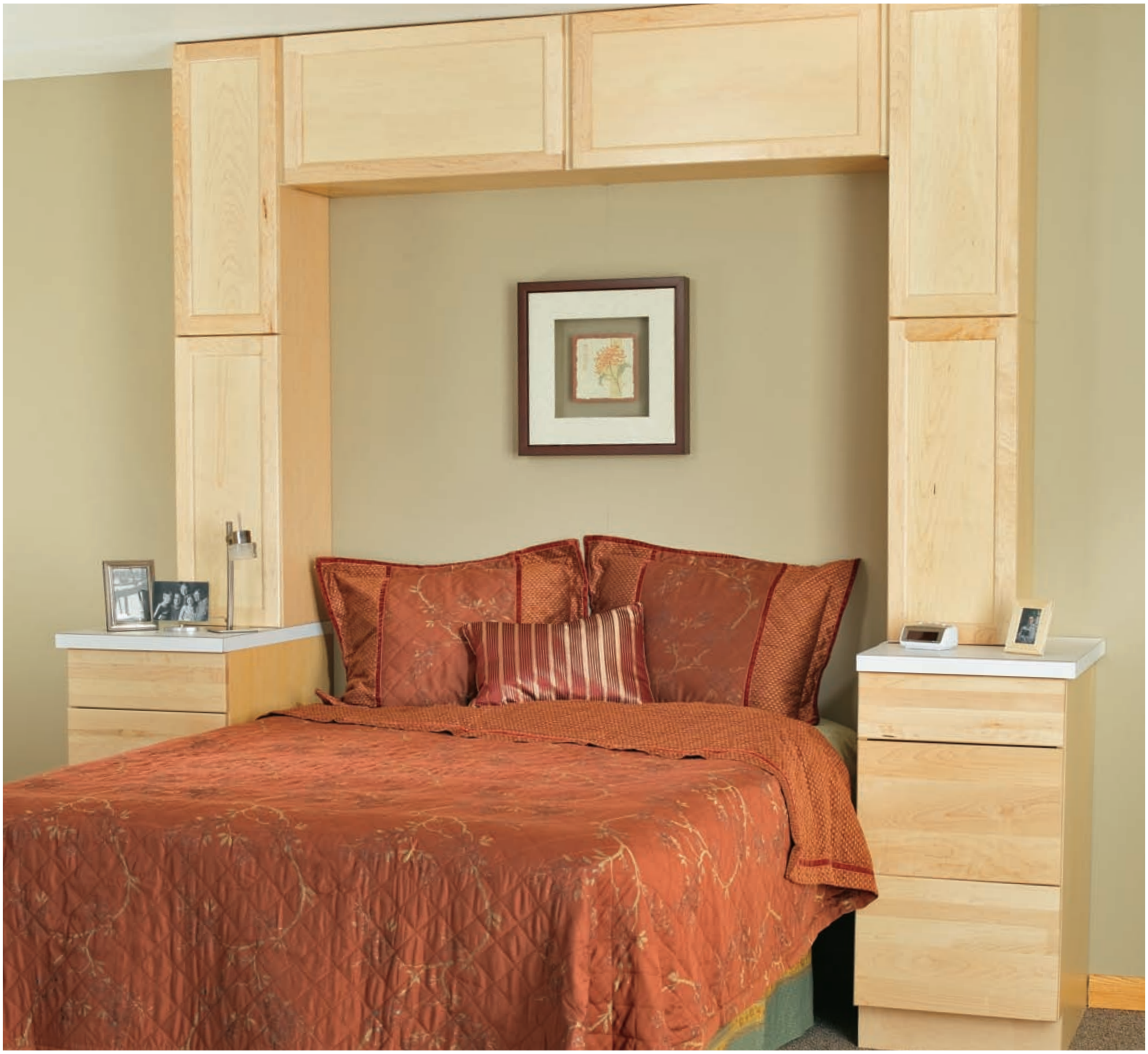
Butt the left bookcase to the window trim and fasten it to a wall stud with a few screws or nails driven through the backer (photo 15). Make sure the case sits as tightly to the wall, seat top, and window trim as possible. Expect to make some on-site corrections as necessary to accommodate out-of-plumb walls or other imperfections. Slight gaps can be caulked later. Repeat for the right-side bookcase and then measure, cut and install the top shelf. If painting, caulk wherever necessary (photo 16). Fill exposed holes for nails and screws, then prime and paint or apply another finish of your choice. Make or buy a comfortable seat cushion. Finally, brew a cup of coffee, grab a good book, and get busy relaxing.

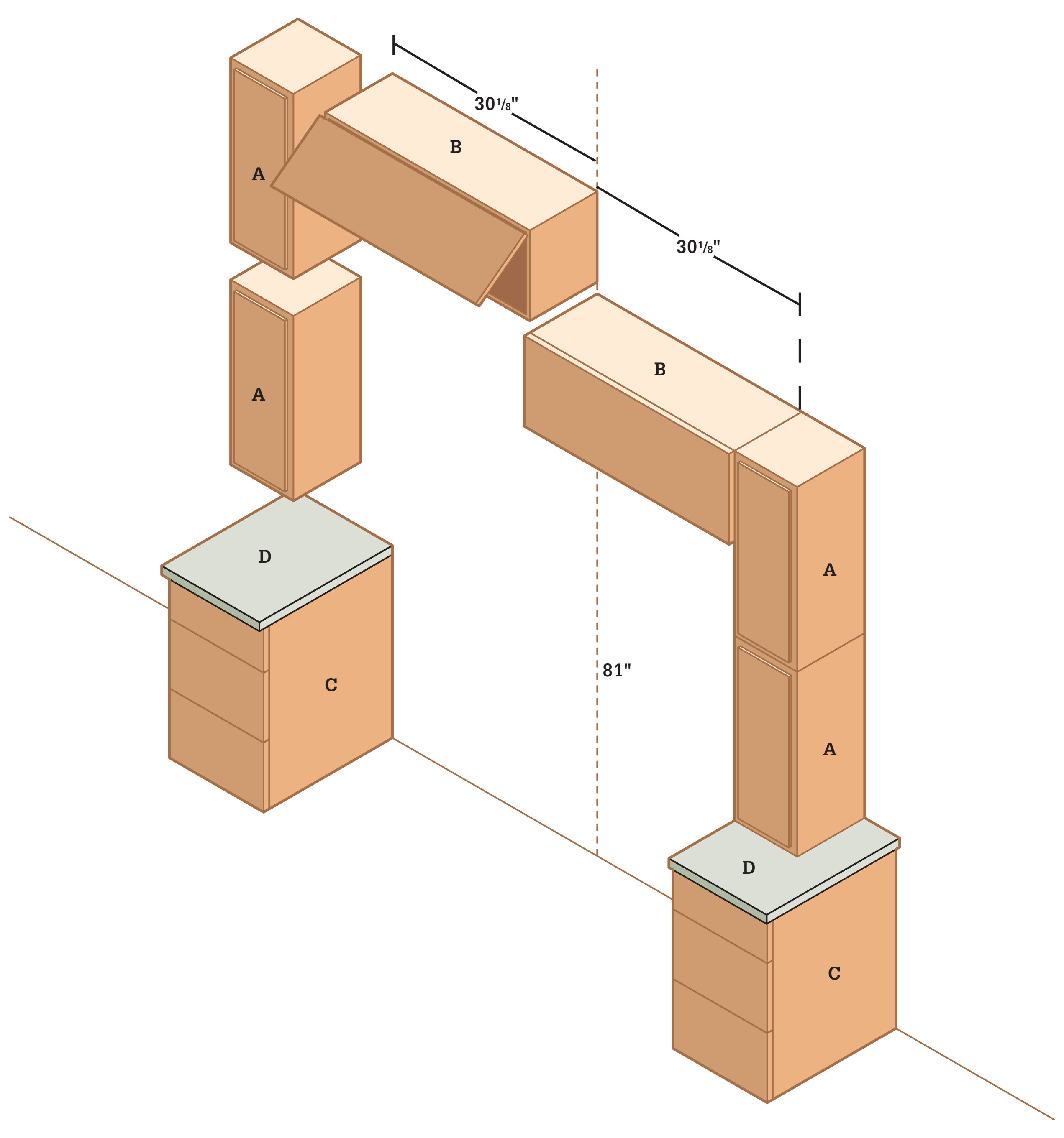
Bed Surround

Headboards aren't the only way to adorn the head of a bead. Indeed, it can be dressed not only with form but with terrific function. Combining cabinets of differing sizes and shapes provides both the finish to a bed—that is often the sole domain of the attractive but purely decorative headboard—and the utility of cabinets that double as both decoration and much needed storage.

The cabinets' clean, defined lines lend this Bed Surround a modern feel while the option for above-bed lighting creates the halo of a warm and calm space for starting and ending the day or tucking away for a quick nap.

Before getting started, determine if you want the option of cabinet-mounted lights. If so, rough-in the wires and switch(es) prior to installing the cabinets. Once the cabinets are on site, prep them before hanging by drilling the appropriate holes to accommodate the wires and house the light fixtures.




30⅛"
30⅛"
A
B
A
B
D
A
C
81"
A
D
C

Cutting List

Part	No.	Desc.	Size
A	4	Wall cabinet	12 × 30"
B	2	Wall cabinet	15 × 30"
C	2	Base cabinet	18 × 34½"
D	2	Countertop	1½ × 19 × 25"

How to Build a Bed Surround

LAY OUT THE PROJECT

Choose the exact location for your bed surround. Mark the left and right edges of the project area, and then find the centerline. Be very exact. Using a 4 ft. level, plumb up from the center point. Mark a plumb line (photo 1). This is the control point from which you map out the rest of the layout. Measure 30⅛" left and right of the center point to mark the outside edges of the horizontal uppers (photo 2). Drive a 6-penny nail right on the centerline to hold your tape.

INSTALL THE UPPER CABINETS

Install a temporary ledger at the location of the bottom edges of the horizontal cabinets (81" above the floor in our project). Carefully install the horizontal uppers by resting them in position on the temporary ledgers and then driving screws through the cabinet backs and into wall studs (photo 3). If you discover gaps between upper cabinets, create filler strips to insert between the cabinets (photo 4) and conceal the gaps (see page 32).

From the outside edges of the installed horizontal upper assembly, plumb down to the floor with a 4-ft. level. With the uppers installed, you now have rock solid control points to plumb down to the floor from. These lines enable you to place the lower cabinets accurately and keep all face frames tight. Measure the base cabinets' width to the left and right of the plumb lines and mark the baseboard for removal (photo 5). Using a combination square and pull saw, mark and remove the base molding. Be careful not to damage the wallboard when removing the base molding.

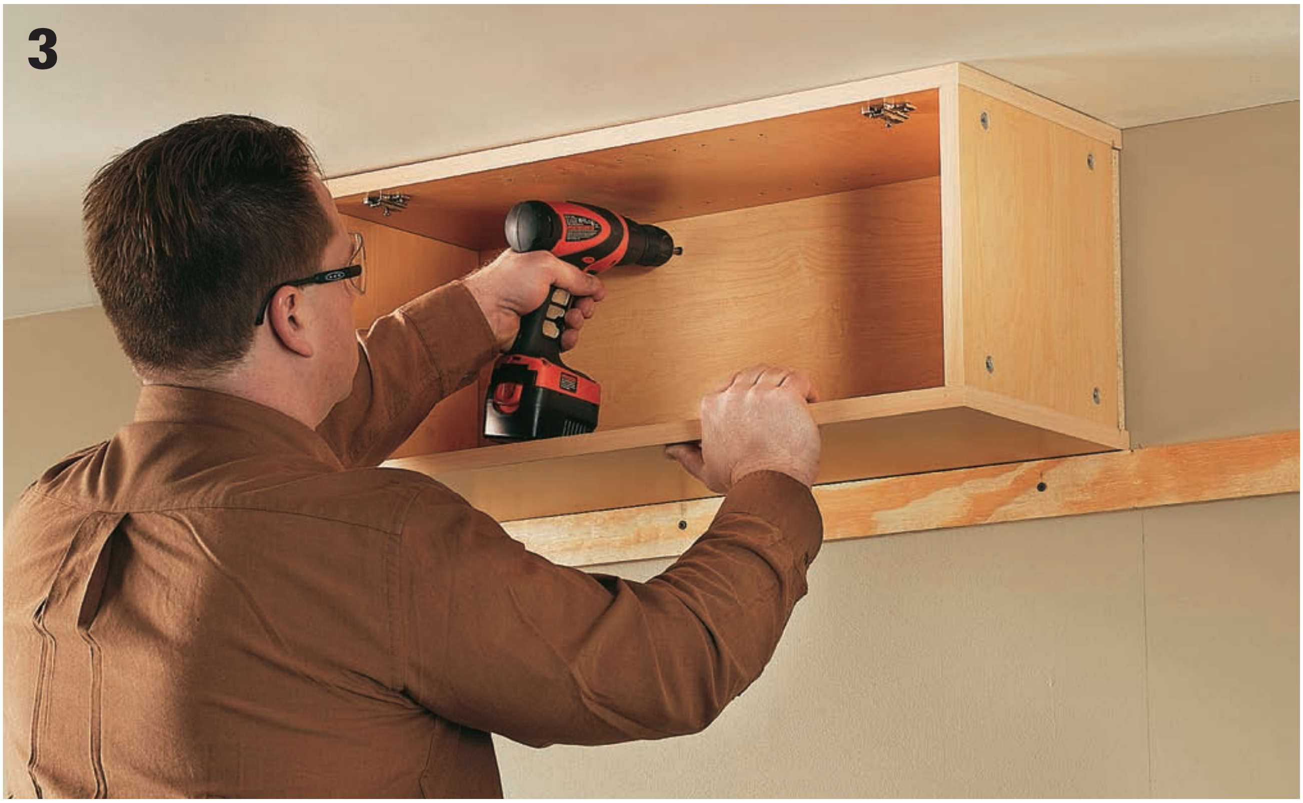
INSTALL THE VERTICAL ELEMENTS

The base cabinets will need some type of countertop surface so they can function as nightstands and also support the vertical upper cabinets. We made particleboard countertops with plastic laminate applied to the tops and edges. Because the sizes are relatively small, this project also presents a good opportunity to experiment with some high-end countertop materials, such as granite or quartz. Install the countertops before installing the base cabinets in the project area (photo 6). Install the left base cabinet tight to the plumb line (photo 7).

Draw a plumb reference line in the exact center of the project area.

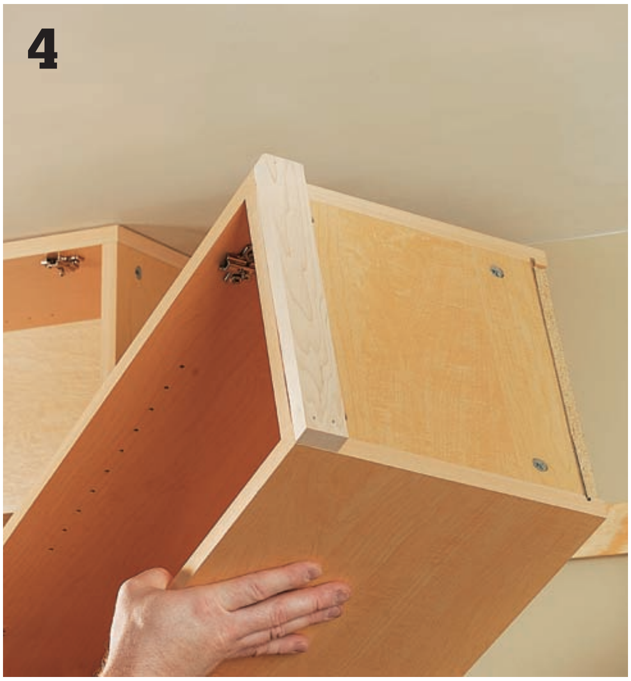
Mark vertical reference lines ⅛" further out from the centerline than the horizontal cabinet height.

3



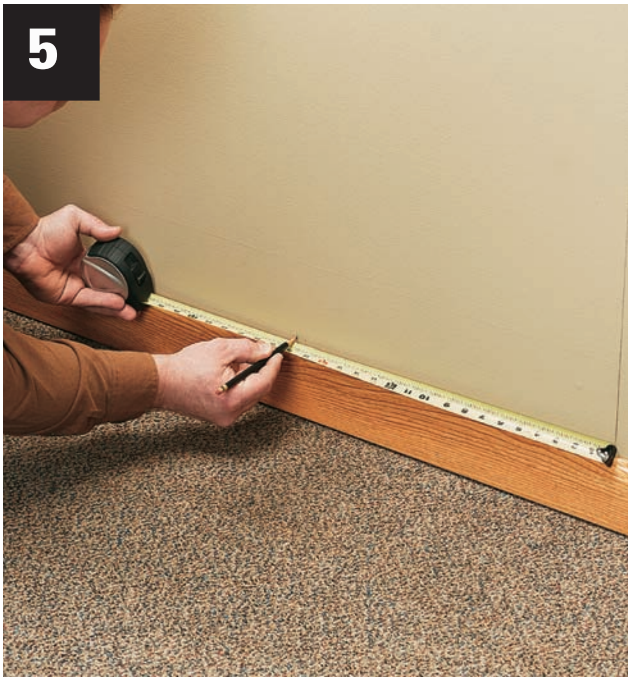
Move the upper cabinets into position and fasten them to wall at stand locations using screws.

4

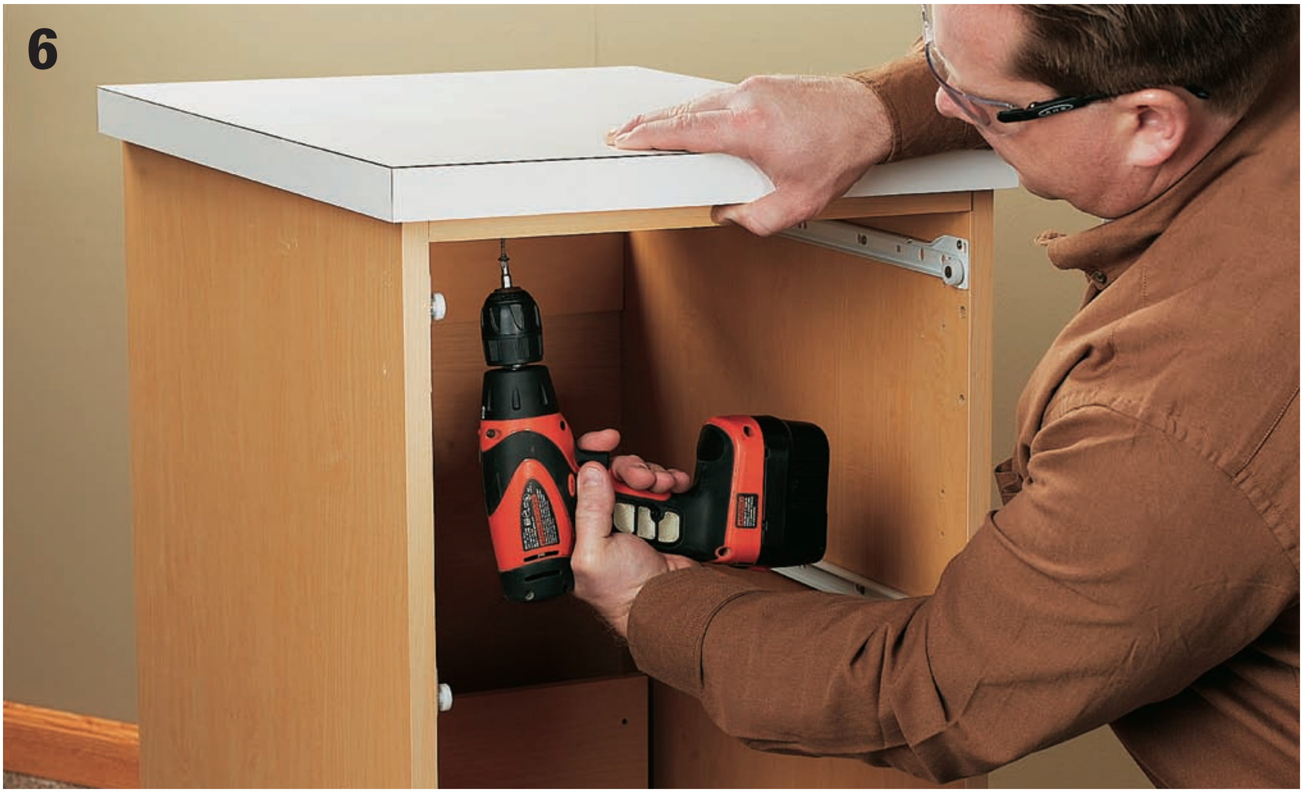


Cut and attach filler strips to the edge of one of the cabinets if there is a gap between it and its neighbor.

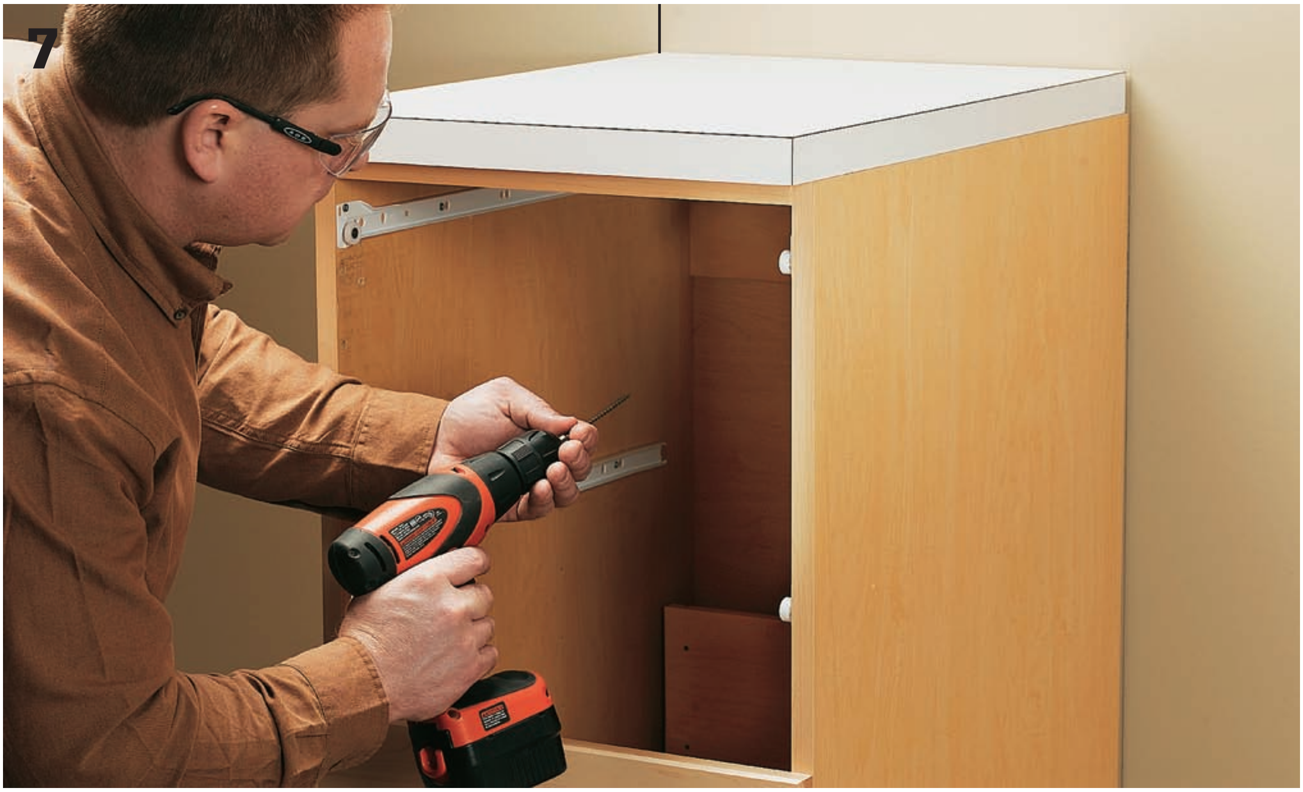
5



From the plumb line, measure out the exact width of the base cabinet carcass and mark the base molding for removal.



Install the laminate countertop on the base cabinet prior to installation. Make sure it is flush to the inside edge and back of the base cabinets and overhangs the front and outside edges.



Install the left base cabinet tight to the plumb line. Drive screws into a stud at both the top and bottom of the cabinet carcase.

On top of the left base cabinet, mount the first vertical upper tight to the plumb line. Be careful of the laminate countertop during installation. Mount the second vertical upper tight to the first. Make sure the face frames are flush. Shim the back as necessary and make sure to catch wall studs with the fasteners (photo 8). Repeat these steps for the base cabinet on the right side.

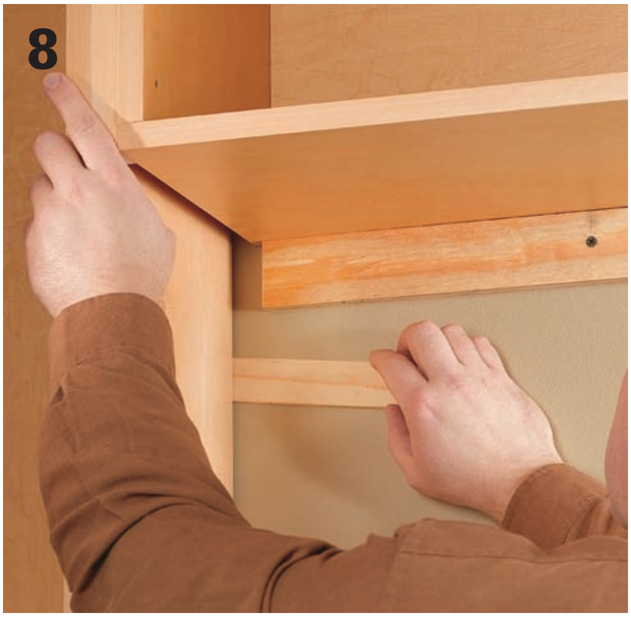
JOIN THE CABINETS

The horizontal uppers and vertical uppers should be at the same height. If so, flush up and fasten the face frames (photo 9).

If the cabinet gangs are not flush, adjust the horizontal uppers to mate with the left and right vertical gangs. Once flush in all directions, fasten the face frames and secure to the wall (photo 10).

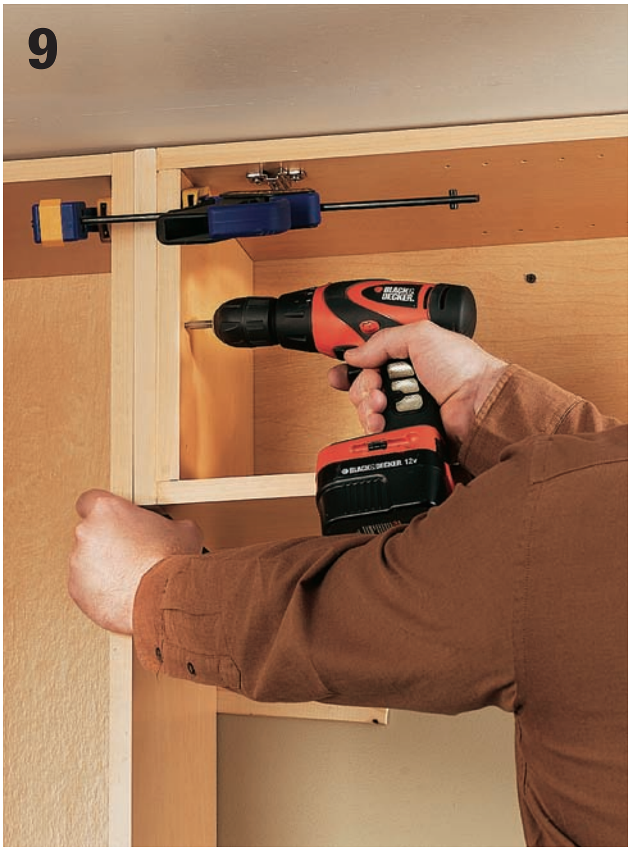
Install (or have installed) the light fixtures and switches. Remove the temporary ledger, patch drywall, caulk, and trim cabinet bases as required. Sand and spot-touch the finishes.

8



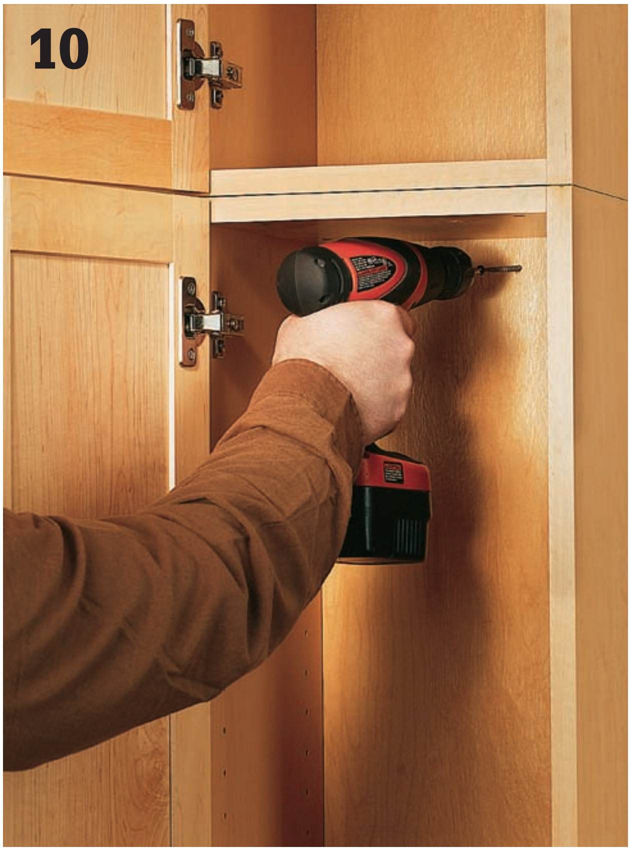
Sometimes shims are required to keep face frames tight and flush, due to irregularities in the wall surface. Insert shims behind the cabinets as needed and remove excess shim material after installation.

9



Fasten the face frames of the vertical uppers to the horizontal uppers. Pre-drill and countersink before driving screws.

10



Once the face frames are fastened together, attach the wall cabinets securely to the wall with screws driven through the cabinet backs at stud locations.

Loft Bed

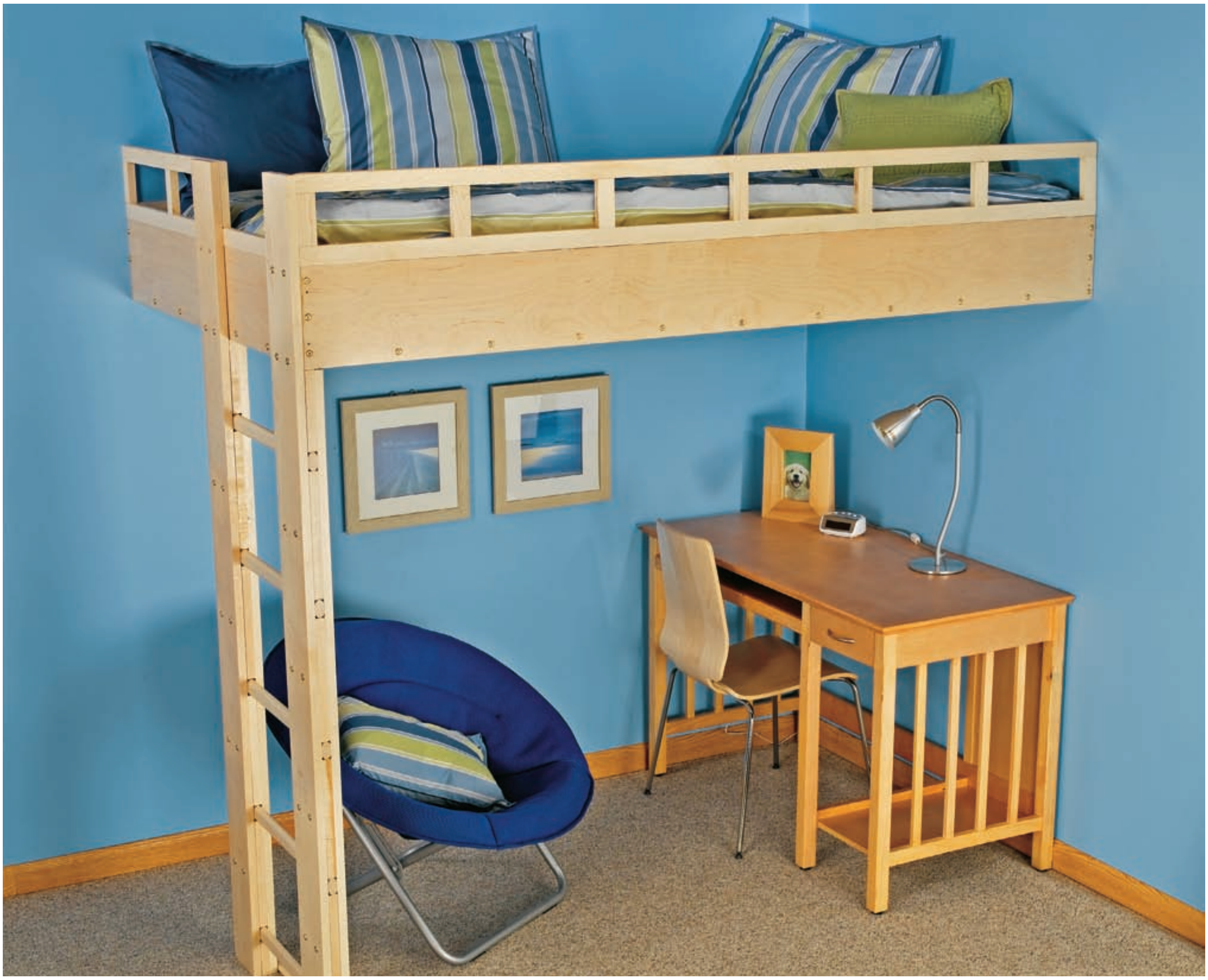
If you had—or wanted—a loft bed back in college or in your first apartment, then this is a project you're going to like. But your kids will probably like it more because it's cool, fun, and their friends probably won't have one.

This loft bed is designed to open up floor space usually consumed by a bed. It also provides a location underneath it for a kid or kids to play, do activities or set up a desk. And, it because it ties in with the wall, it can work for kids of all ages.

Because you can tie into the wall, this loft bed probably has a little more oomph than the one you might have built with your old roommate. And, a built-in safety rail adds an extra layer of protection for younger kids. While you can make the bed to your own specifications following the techniques below, the bed design here is based on a twin-sized mattress, which is 39" × 75".

The outside dimensions of the bed frame are 48¾" × 80", which allows room up top for books, a drink, and a little extra room for the bedding to drape when the bed is made. Your little princess or prince will love climbing the ladder to get in bed.

Safety Note: Never attach hooks or handles to the loft bed and do not hang items from it, including rope and belts. Children can catch themselves on these items when playing or in the event that an accidental fall occurs.

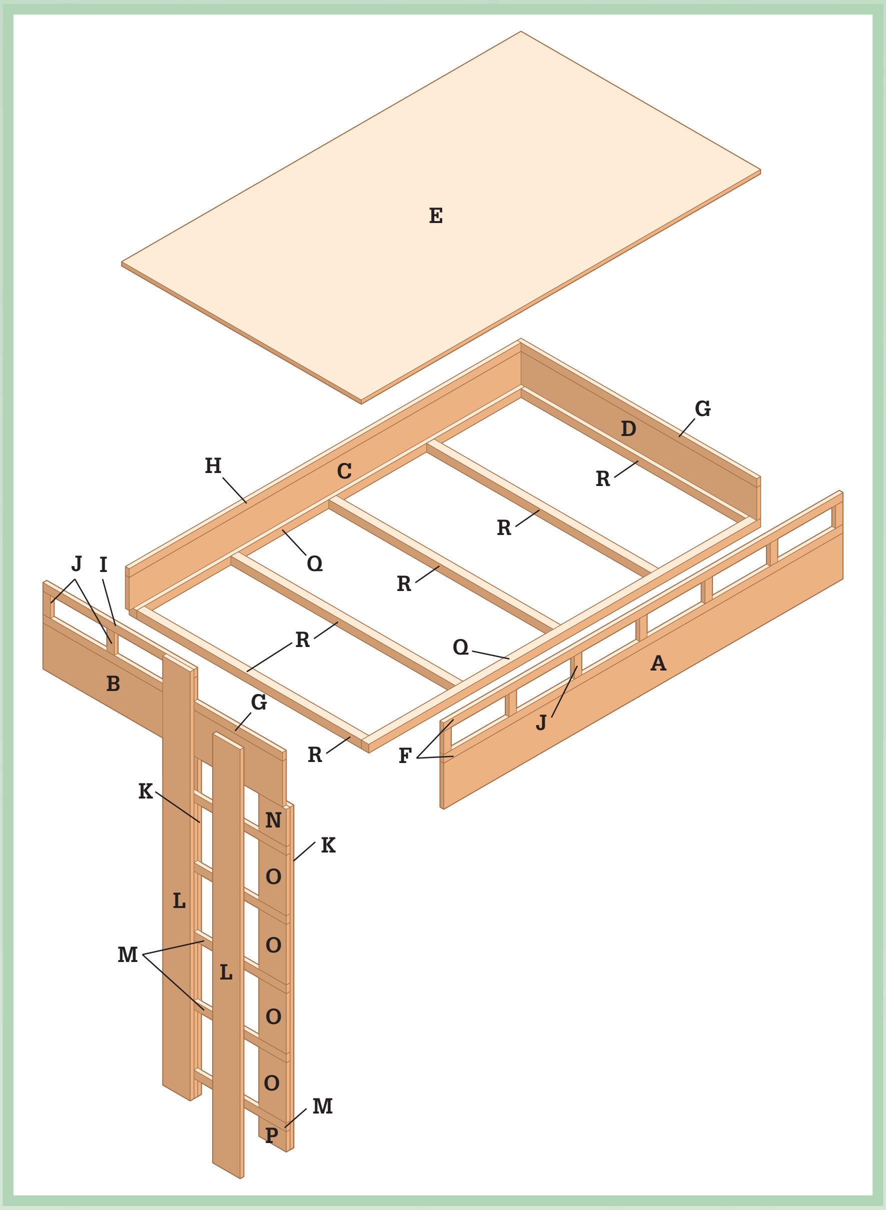


Tools

- Miter saw
- Table saw
- Circular saw
- Drill/driver
- Level
- Stud finder
- Hammer
- Tape measure
- Nail set
- Pneumatic nailer/compressor
- Router and bits
- Sander
- Carpenter's square
- Shooting board or straightedge

Materials

- (2) ¾" × 4 × 8 ft. maple plywood
- (6) 1 × 2 × 8 ft. maple
- (4) 1 × 6 × 8 ft. maple
- (3) 2 × 2 × 8 ft. pine
- Brass screws
  with grommet washers
- Deck screws
- Trim head wood screws
- Finishing materials



Cutting List

Part	No.	Desc.	Size	Material
A	1	Box front	¾ × 8 × 80"	Maple plywood
B	1	Box end–left	¾ × 8 × 48"	Maple plywood
C	1	Box back	¾ × 5¾ × 78½"	Maple plywood
D	1	Box end–right	¾ × 5¾ × 48	Maple plywood
E	1	Box bottom	¾ × 48 × 80"	Maple plywood
F	2	Box/rail cap–front	¾ × 1½ × 80"	1 × 2 maple
G	2	Box cap–end	¾ × 1½ × 48"	1 × 2 maple
H	1	Box cap–back	¾ × 1½ × 78½	1 × 2 maple
I	1	Rail cap–end	¾ × 1½ × 30¼	1 × 2 maple
J	10	Rail post	¾ × 1½ × 4	1 × 2 maple
K	2	Ladder leg–short	¾ × 5½ × 59½"	1 × 6 maple
L	2	Ladder leg–long	¾ × 5½ × 79¼"	1 × 6 maple
M	6	Ladder rung	¾ × 1½ × 24	1 × 2 maple
N	2	Ladder filler	¾ × 5½ × 6½"	1 × 6 maple
O	8	Ladder filler	¾ × 5½ × 10½"	1 × 6 maple
P	2	Ladder filler	¾ × 5½ × 3½	1 × 6 maple
Q	2	Cleat–long	1½ × 1½ × 79¼	2 × 2 maple (or pine)
R	5	Cleat–short	1½ × 1½ × 45	2 × 2 maple (or pine)

How to Build a Loft Bed

1

Once you've determined the height you want the mattress to be, strike a level line indicating the bottom of the mattress support box.

2

Cut stock using a circular saw and straightedge guide, and stack it neatly. Label each piece (magic marker on blue painters tape works) to make identifying it later easier.

LAY OUT THE WALL CLEATS

Determine the length, width, and location of the bed frame. Plan your layout so that once the mattress is in, you have 4" to 6" all the way around it inside the mattress box, providing room for bedding and other things. Mark a level line on both walls at the bottom of the mattress box (photo 1).

BUILD THE MATTRESS BOX

The mattress box is fabricated from ¾" thick maple plywood, which creates a clean, modern look once installed and finished. Maple is also a very stable material that delivers dependable mechanical connections for assembly. And, because we can make panels larger than with dimensional lumber, we create a nest for the mattress to set inside that results in a curb that will help keep children safe at night. The box should be assembled as completely as possible on the ground (in your shop) and then hoisted into position on the wall cleats when you've taken it as far as it makes sense to go. The two sides of the box that face out into the room are wider than the two that go against the walls because the room-side of the box needs to conceal the cleats that support the plywood box bottom. These cleats (the room side ones) are attached to the frame first and the other two are attached to the walls first. The plywood bottom is butted against the room sides of the box frame, and is flush with the outside edges of the wall sides of the frame. The top edges of the box are covered with 1 × 2 maple on-edge, which also serves as the bottom rail of the railing on the room sides.

Rip-cut the four box frame sides from ¾" maple plywood, using a tablesaw or a circular saw and straightedge cutting guide (photo 2). Note that the two frame sides that go against the wall are 2¼" narrower than the ones facing the room.

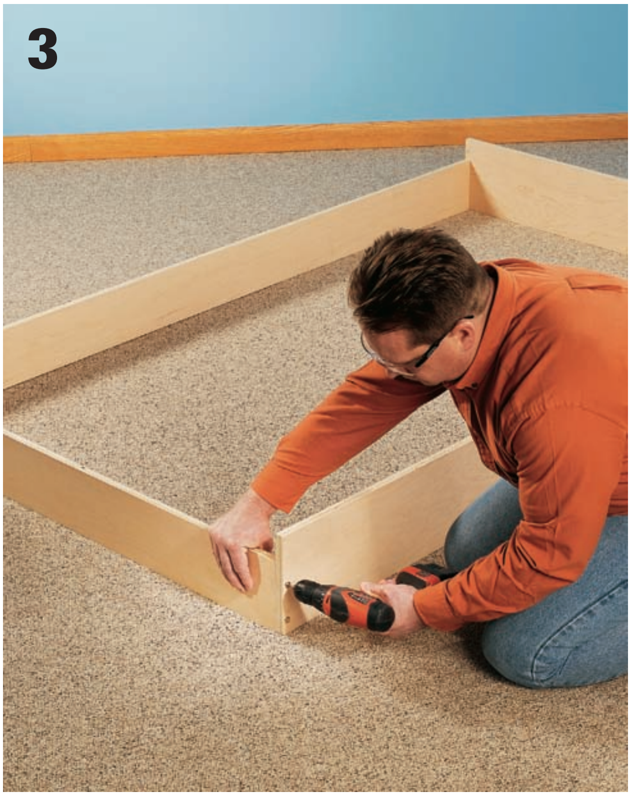
The fastener scheme we chose for this bed is to tack the parts together with glue and pneumatic nails, then reinforce with brass screws and grommet-style washers once things are squared up (the brass screws only need to be used on visible surfaces). Join the corners of the box with glue and screws (photo 3). The two exposed sides should conceal the end grain of the side they're attached to. Work on a large, flat surface with the box sides upside-down so their top edges are even.

Cut the cleats to length from 2 × 2 pine stock. Attach cleats to the bottom inside faces of the exposed box sides, flush with the bottom edges of the box (photo 4). Use glue and brass wood screws driven at 8" intervals to secure the cleats.

Once the cleats are in place, cut the mattress box bottom to size and attach it to the cleats that are connected to the room sides of the box. Drive 2" deck screws through the plywood bottom and into the cleats, spaced no more than 12" apart (photo 5). At the wall-sides of the box, the plywood bottom should be flush with the outside edges of the box. Also drive 2" deck or wallboard screws into the plywood box edges on this side.

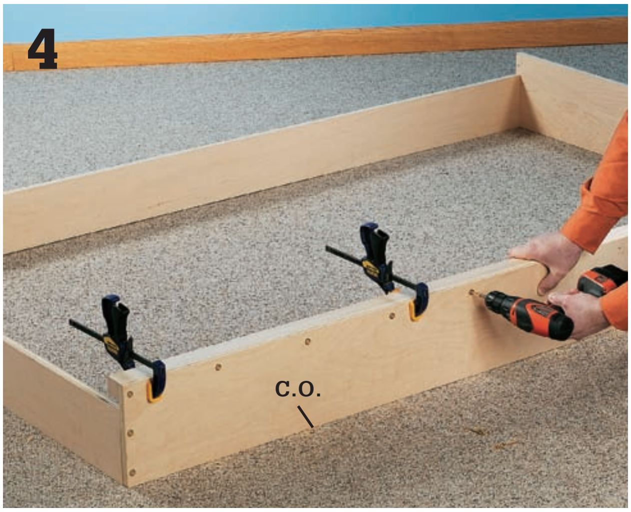
Cut 3 2 × 2 stiffeners and position them on the undersides of the plywood. The ends should be flush against the room side cleat. Tack in place and then attach by driving screws through the top of the plywood.

3



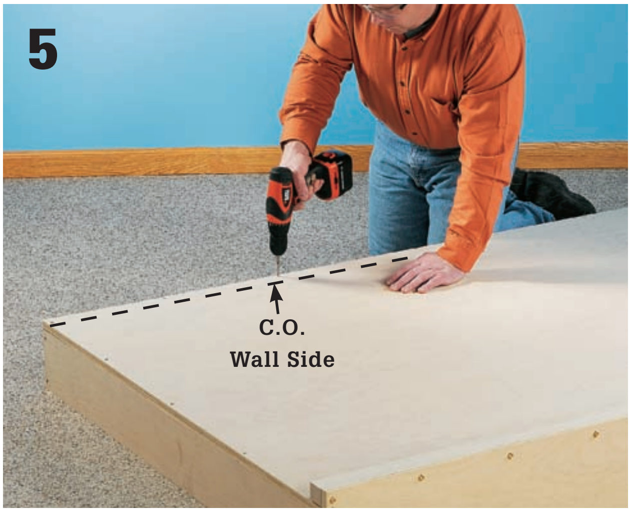
Join the corners of the mattress box with glue and a few nails or with glue and clamps, and then reinforce each joint with three #8 × 2½" brass wood screws. Space the screws evenly. We added decorative grommet-style brass washers instead of counterboring and plugging the screw holes.

4



Attach the cleats that support the mattress box bottom to the two sides of the box that face the room.

5



Attach the plywood mattress box bottom by driving screws through the plywood and into the two cleats mounted inside the box. Also drive screws through the box bottom and into the back and right end edges of the box.

Run the top edges of the 1 × 2 maple stock for the railing and edge caps parts through a router table fitted with a ¼" roundover bit. Cut the box caps, cap rails and rail posts to length (use a stop block on your power miter saw to make uniform length pieces). Attach the 1 × 2 caps to the back edge and right end (the wall sides) with glue and finish nails (drill pilot hole for the finish nails if hand-driving them). Before attaching the front and left side box caps, lay out positions for the railing posts according to the diagram on page 95 (photo 6). For best accuracy, gang-mark the post locations on the rail caps and box caps.

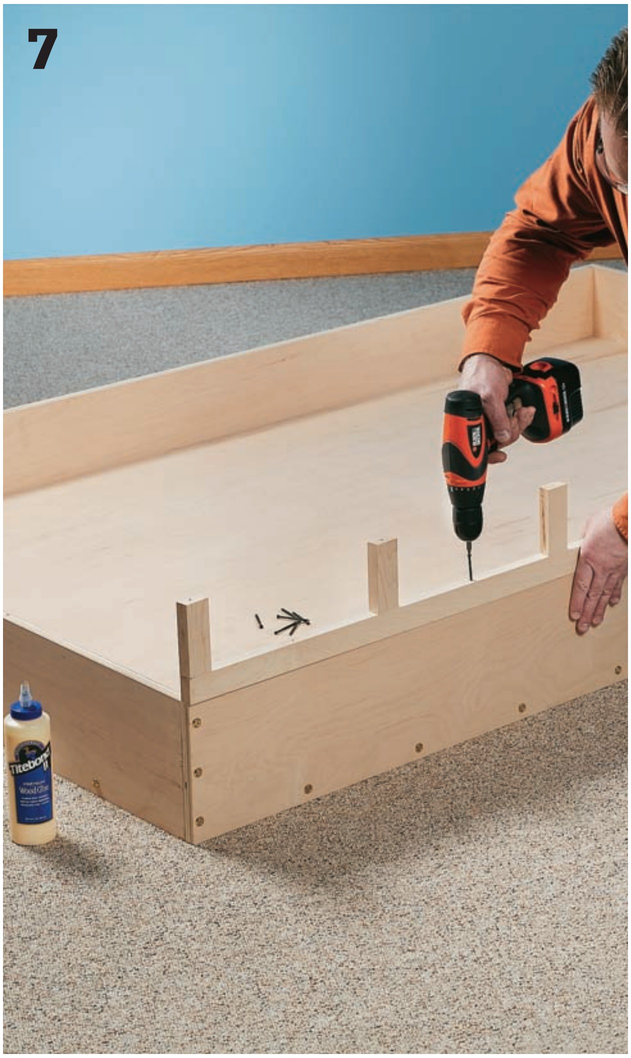
Attach each post to the box caps at marked locations, using glue and two 3" deck screws or wood screws driven up through pilot holes in the box cap and into the bottom ends of the posts. Then, attach the box caps with attached posts to the front and left sides of the mattress box, using glue and 3" trim-head wood screws driven down through the top edges of the box caps and into the box at 12" intervals (photo 7).

Next, attach the railing caps to the tops of the railing posts with glue and trimhead wood screws driven down through the rail caps and into the posts. Make sure the posts are aligned with the reference lines you marked for their positions. Finish-sand the mattress box (you may want to back out the screws a ways to get underneath the grommets). It's best to wait until all parts are built so you can apply finish at the same time

6

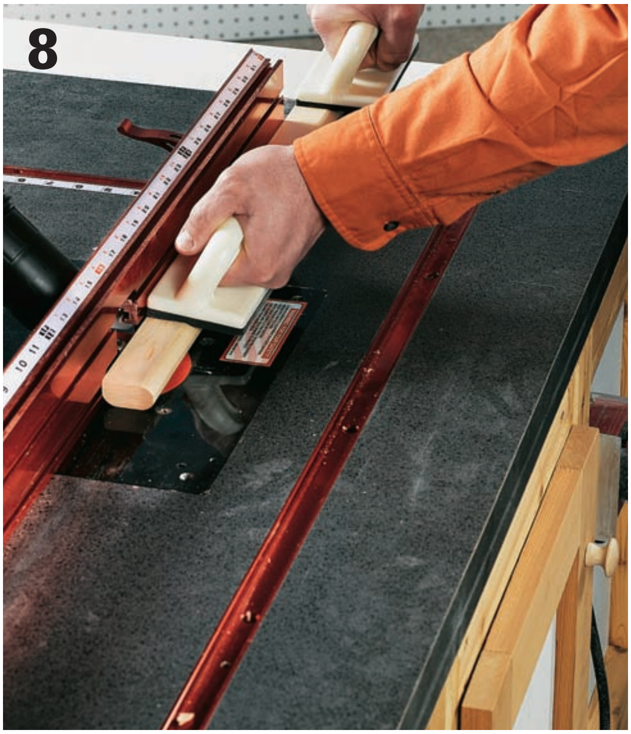
Lay out the locations for the railing posts on the mating rail and box caps so you'll be sure they're aligned perfectly.

7



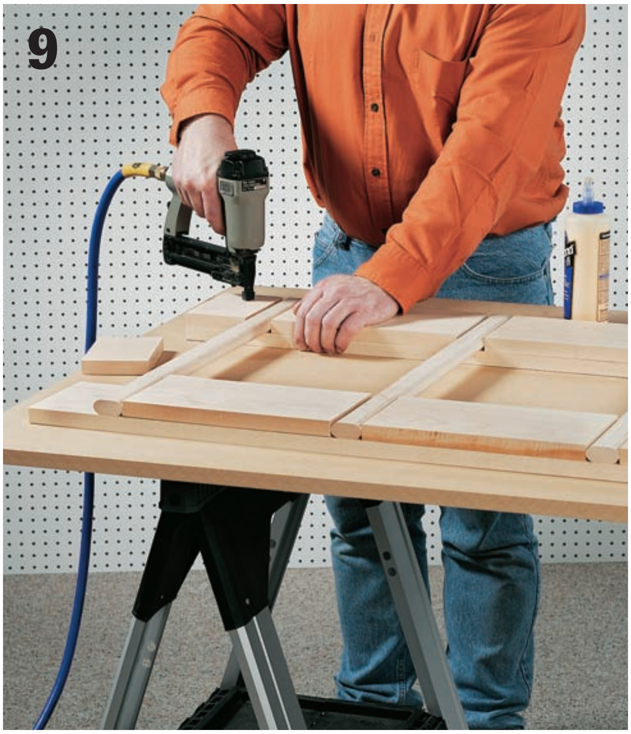
After screwing the railing posts to the box caps, attach the assemblies to the front and left sides of the mattress box using counterbored trim-head wood screws.

8



Shape the bullnose profiles into the top edges of your 1 × 2 rung stock before cutting the rungs to length.

9



The ladder is a 3-ply assembly. The short leg is the first layer. Next come the ladder blocks that run parallel to the leg. After you install a ladder block, you install a rung perpendicular to it, working your way down the ladder—block, rung, block, rung, etc. Make sure the blocks are flush to the edges of the leg and that the rungs are held tight to the blocks. Use glue and screws (or pneumatic nails).

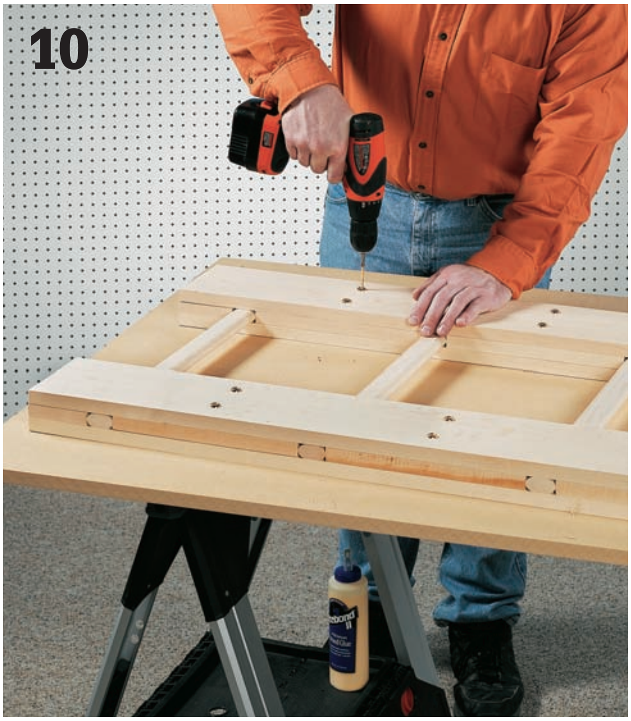
Adding a Ceiling ▸

The bottom edges of the front side and left end of the mattress box are still exposed plywood edge grain. There are a couple of ways of dealing with this. One is to conceal the edges with heat-activated maple veneer tape. Or, you can tack on additional strips of maple 1 × 2. But we chose to create a "ceiling" for the area underneath the loft bed by attaching a sheet of tempered 1/4" hardboard to the underside of the box.

MAKE THE LADDER

The ladder/post is made from built-up 1 × 6 maple boards. The rungs are 1 × 2 maple boards with bullnosed edges. To simplify the machining, cut the bullnoses by profiling all four edges of your 8-ft. 1 × 2 stock on a router table fitted with a 3/8" roundover bit (photo 8). The rungs should have a more pronounced bullnose than the top of the 1 × 2 box caps. Then cut the rungs to length with a miter saw or power miter saw (a stop block is a good idea for ensuring uniform lengths).

Cut the ladder legs and ladder blocks to length from 1 × 6 maple stock. Arrange the shorter legs on a flat surface with the outside edges 24" apart and the end flush. Make sure legs stay parallel at all times. Install the 6½" blocks first flush with the top ends of the legs. Use glue and a couple of finish nails or pneumatic nails to secure the blocks. Then begin working downward, adding rungs and blocks according to the diagram on page 95 (photo 9).



Attach the long outer legs to the blocks, rungs and short legs, ensuring that the bottoms and sides are flush. Glue and screw securely with flat head brass wood screws and decorative grommet-type washers.

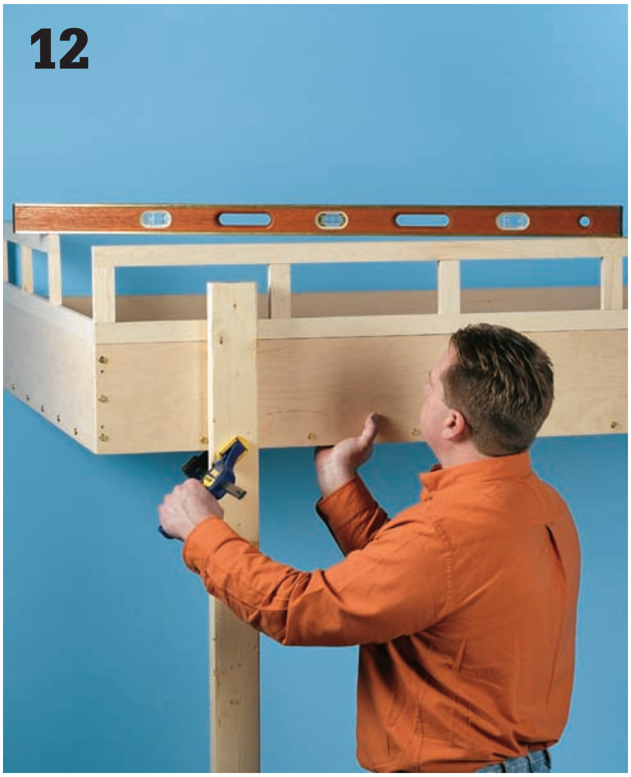
Fasten the longer legs over the assembly, sandwiching the blocks and rung ends between 1 × 6 legs (photo 10). The extra 15" of length should be at the top of the longer legs.

INSTALL THE LOFT BED

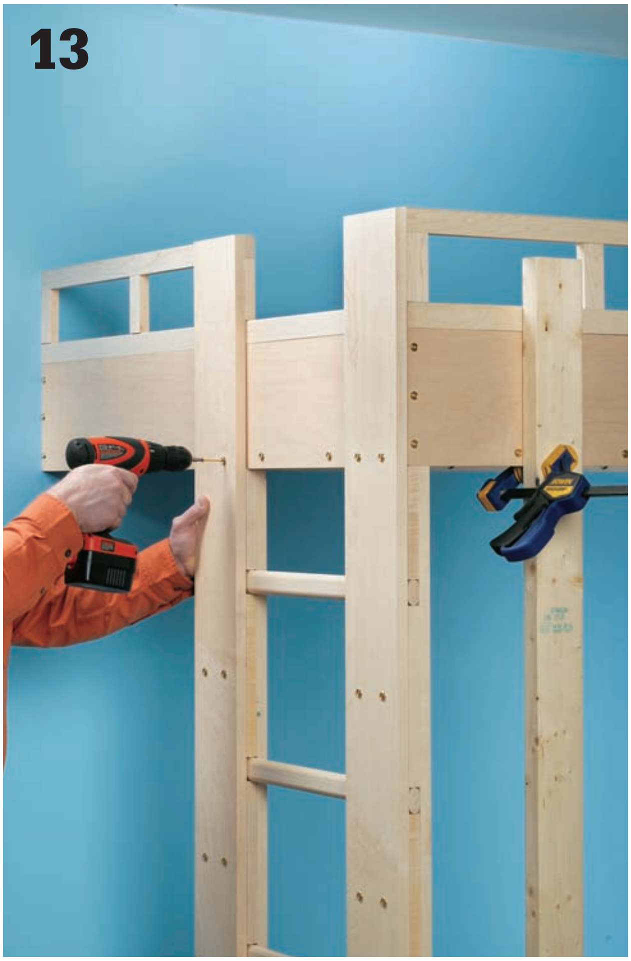
Before installing the loft bed, apply your finish of choice (a few coats of durable polyurethane varnish is a good option). Pre-assemble the long side cleat and short side cleat into an L-shape, using glue and 3" deck screws. Attach the cleat to the wall at the mattress box layout lines. Apply panel adhesive to the back faces of the cleats before installing. Attach with ⅜ × 3½" countersunk lag screws with washer at each stud location (photo 11).

Clamp a long 2 × 4 to the front face of the mattress box so the 2 × 4 will support the front at roughly the correct height when it is installed. With a couple of helpers (or more), raise the box and rest the back and right end on the walls cleats, making sure the box is square to the corners and flush against the walls. Place a level on the box and adjust the clamp and 2 × 4 brace so the box is level (photo 12).

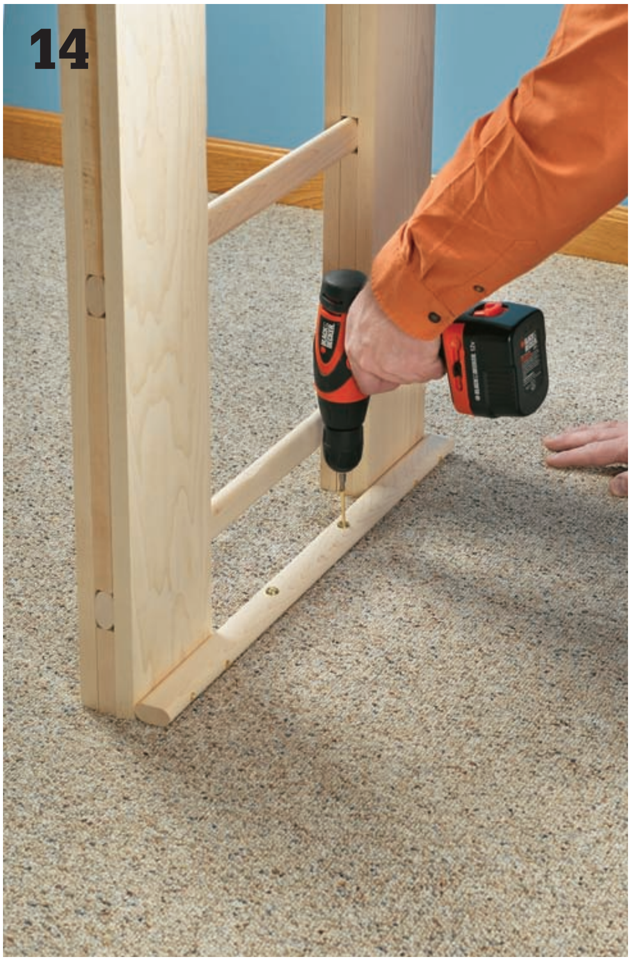
Pre-assemble the wall cleats into an L-shape and fasten them to the wall studs with lag screws and adhesive.



Check with a 4 ft. level across the corner of the box near the ladder location to make sure the box is level on both sides.



Position the ladder at the corner of the front and left side edges. The rung layer and short leg layer should fit snugly underneath the box, since the ladder will serve as a corner support post. Attach the ladder to the mattress box.



Secure the bottom of the ladder/corner post by attaching a cleat to the floor behind the ladder legs.

Once the mattress box is level, face-nail through the front and left ends of the box and into the wall cleats to hold the bed in place. After the ladder is secured and attached to the bed it will be safe enough to go topside and drive some nails through the box bottom and into the wall cleats.

INSTALL THE LADDER

Position the ladder under the mattress support box. Make sure that the right side of the ladder is flush with the long, outside edge of the mattress support box. Plumb it and fasten using glue and screws. The short legs of the ladder create a ledge to help support the free end of the box.

Drive 3½" brass screws with grommet washers through the ladder leg and upper ladder block at 8" intervals to secure the ladder (which functions as a post) to the mattress box (photo 13). Locate the screws so they hit the 2 × 2 cleat at the bottom, inside edge of the box. Also drive a few countersunk 2" screws down through the plywood box bottom and into the top ends of the short legs.

Double-check the ladder to make sure it is plumb and then screw the sixth ladder rung to the floor, directly behind the bottom of the ladder, laying flat (photo 14). The ends of the rungs should be flush with the outside faces of the ladder legs. Drive screws or nails through the rungs and into the bottoms of the legs to prevent the ladder from moving. Also attach the top ends of the long ladder legs to the top railing caps with trim-head screws. Drive a few extra nails through the box bottom and into the cleats, remove the temporary 2 × 4 brace, and add your mattress.

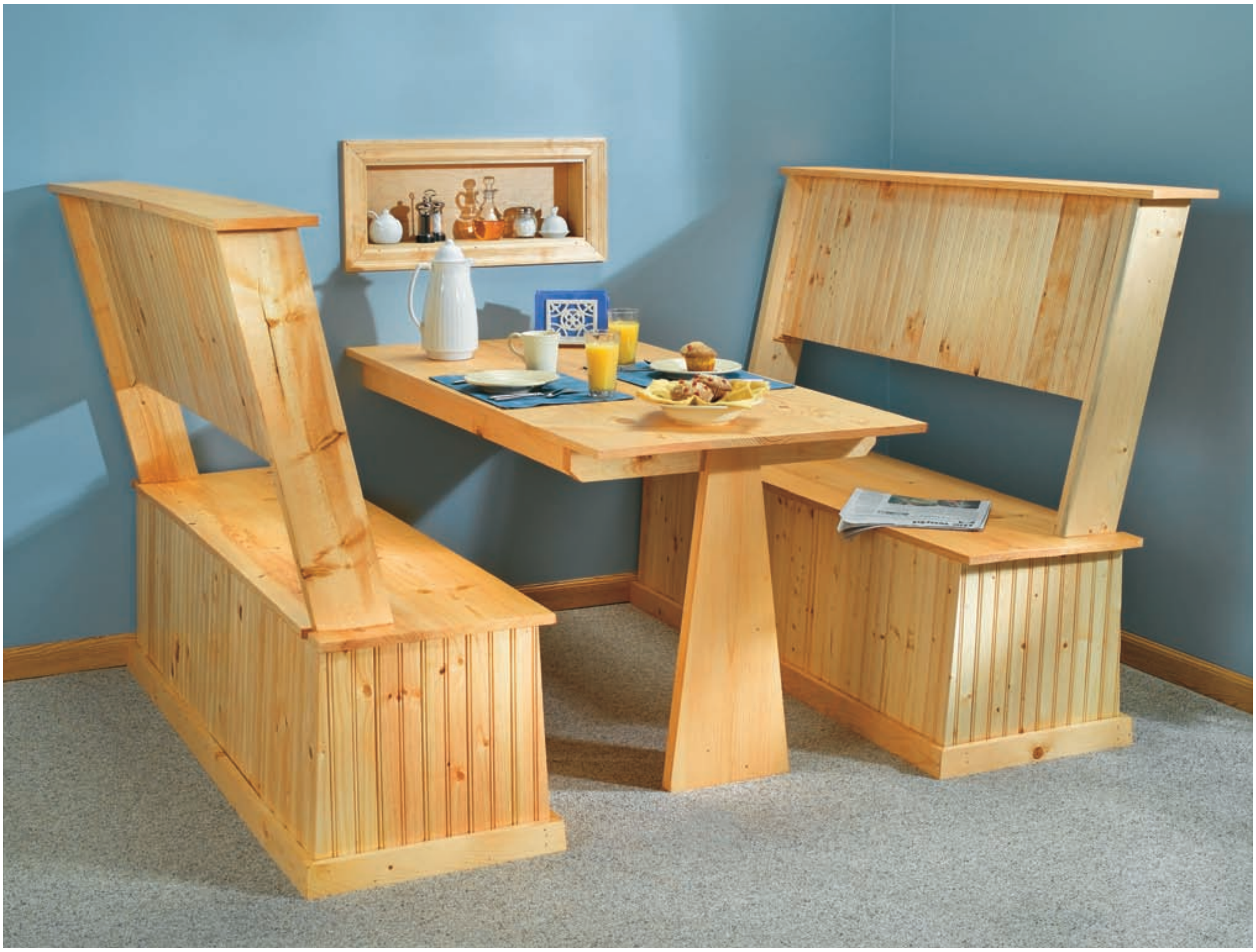
Country Diner

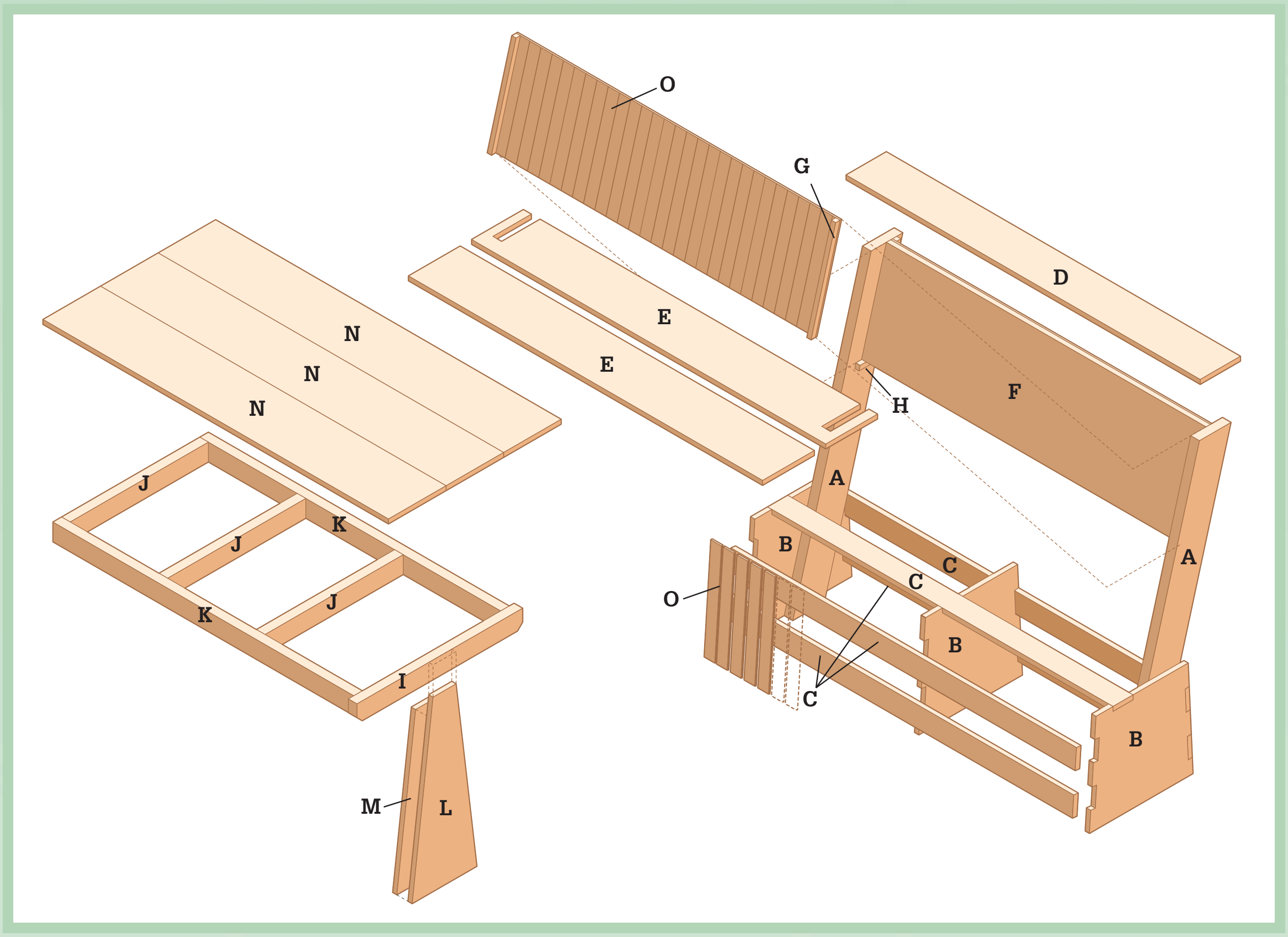
Diners are traditional morning and late-night gathering spots, well-loved for being bright, friendly, and upbeat. They have been graciously kicking off our days for generations with hot food, great coffee and warm company.

At home, breakfast nooks emulating diner booth designs and ambience are traditional gathering spots for morning coffee, preparing for the day ahead, or quiet evening conversations with the family. But at-home breakfast nooks have traditionally been interpreted as dark-stained, hard-edged plywood and somewhat monolithic designs. They lack the spunk, pop, and zip of the local diner and can overpower a small space.

The Country Diner combines the feel of the small-town diner with a modern flare that keeps up with your family. While we've used plywood for the bench supports, we wrapped it in warmer white pine that can be left clear, painted, or pickled. The seatboards and tabletop are made from edge-glued pine, but you can choose other materials if you prefer.

The tongue-and-groove pine paneling wrapping the benches adds contour and shadow lines while the bench's back grows right out of the seat. The ascending modern line delivers a sleek shape while the wide bench cap provides a nice capital along with a flat surface. The modern surface looks like it might once have supported white ceramic coffee cups and short-stacks back when diners looked like train cars, yet it's modern and tough enough to stand up to busy families that will use the country diner for a lot more than breakfast.





Tools

Tablesaw
Circular saw and
 shooting board
Jig saw
Tape measure
Cordless drill/driver
Countersink
Combination square
Framing square
Miter saw
Table saw

Materials

Finish materials
(6) tabletop clips
(2) Metal L-brackets
Screws
Nails
Glue
2) 2 × 8" × 10 ft. pine
4) 2 × 4" × 8 ft. pine
2) ¾ × 4 ft. × 8 ft. plywood
10) 1 × 4" × 8 ft. pine
2) 1 × 8" × 8 ft. pine
7) 1 × 10" × 8 ft. pine
1) 1 × 12" × 8 ft. pine
7) ⅜ × 3½" × 8 ft. pine
 bead-board

Cutting List

Key	Part	No.	Size	Material
A	Bench upright	4	1½ × 5½ × 50	Rip from 2 × 8
B	Bench support	6	¾ × 18 × 18	Plywood
C	Bench strut	10	¾ × 3½ × 60	1 × 4
D	Seat back cap	2	¾ × 7 × 61½	1 × 8
E	Seat boards	4	¾ × 9 × 61½	1 × 10 (edge glue)
F	Back panel	2	¾ × 18 × 57	Plywood
G	Back cleat	8	¾ × ¾ × 18	Pine
H	Back cleat	4	¾ × ¾ × 2¼	Pine

Key	Part	No.	Size	Material
I	Table strut/front	1	1½ × 3 × 28	Rip from 2 × 4
J	Table strut/ledger	3	1½ × 3 × 24	Rip from 2 × 4
K	Apron	2	¾ × 3 × 52¼	Rip from 1 × 4
L	Table leg-front	1	¾ × 11¼ × 29¼	Cut from 1 × 12
M	Table leg back	1	¾ × 11¼ × 26¼	Cut from 1 × 12
N	Tabletop boards	3	¾ × 10 × 60	Cut from 1 × 12
O	T&G cladding		⅜ × 6 × cut to fit	Beadboard

How to Build a Country Diner

MAKE THE BENCH FRAMES

The framework for the diner benches is made by fabricating six identical bench supports from plywood (three per bench). The supports are notched to accept five 1 × 4 struts that tie the supports together and provide nailing surfaces for the tongue-and-groove cladding. It's important that the bench supports be identical so the notches align correctly (otherwise the benches won't be square). The best way to make this happen is by fabricating a pattern that will serve as the template for cutting the other pieces. For greatest accuracy, use a router and a template bit to cut the bench supports. But if you are reasonably handy with a circular saw and jig saw, you can use the first bench support as a pattern for marking and cutting the others.

Cut ten 3½" by 5-ft.-long struts from 1 × 4 pine. Then, to make the legs, cut ¾" plywood into six identical 18 × 18" blanks. Taper one of the blanks 1" at each side, so the top edge is 16" long (photo 1).

Lay out the ¾ × 3½" notches for the struts according to the diagram on page 103. Cut the notches with a jig saw (photo 2). Clean up cut edges on the first bench support with a sander, then use the first support as a pattern for laying out the taper lines and notches on the rest of the workpieces.

1

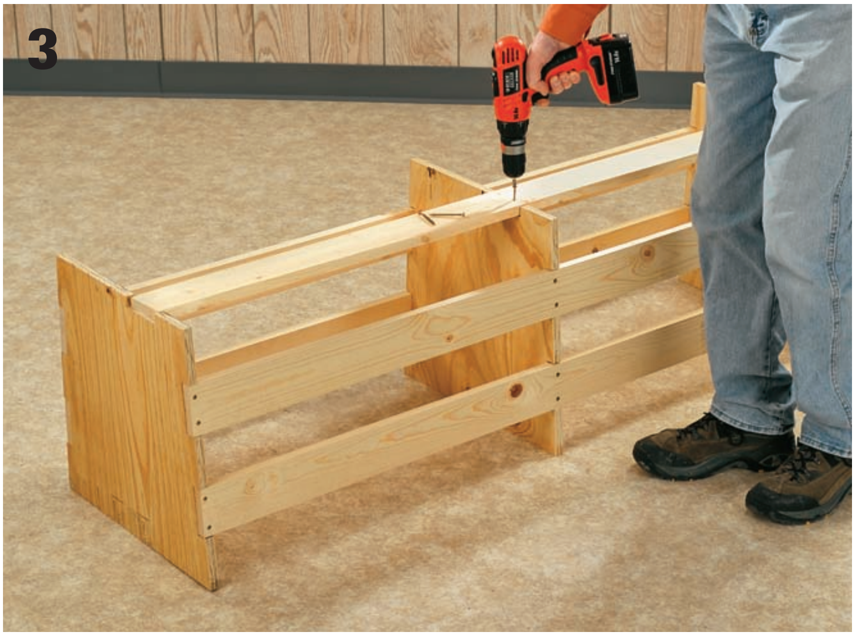
Use a circular saw and straightedge guide to make taper cuts on the first bench support.

2

Carefully cut strut notches using a jig saw. See drawing for locations. Using a cut-off from a strut as a tracing pattern will help you get accurate cuts.

Starting with the top strut, attach the struts to the bench supports, spacing the middle bench support exactly midway in each bench frame (photo 3). Use glue and wood screws driven in countersunk pilot holes to attach the struts to the bench supports.

Finally, cut the uprights. As shown, they are sized to be rip-cut to finished size (1½ × 5½") from 2 × 8 stock. Make sure to take stock from each side so you remove the slight bullnose edges that are cut at the lumber mill. Set your power miter saw to make 12 degree cuts. Trim the ends in parallel cuts to cut the uprights to length (photo 4). Attach the uprights to the inside faces of the outer bench supports, according to the placement information on page 103.



Assemble the frames for the benches by attaching the struts to the bench supports with glue and screws. Take care to keep everything square.

4
BLACK & DECKER

Use a miter saw to cleanly cut the angled seat upright prior to installation.

ADD THE BENCH BACKS

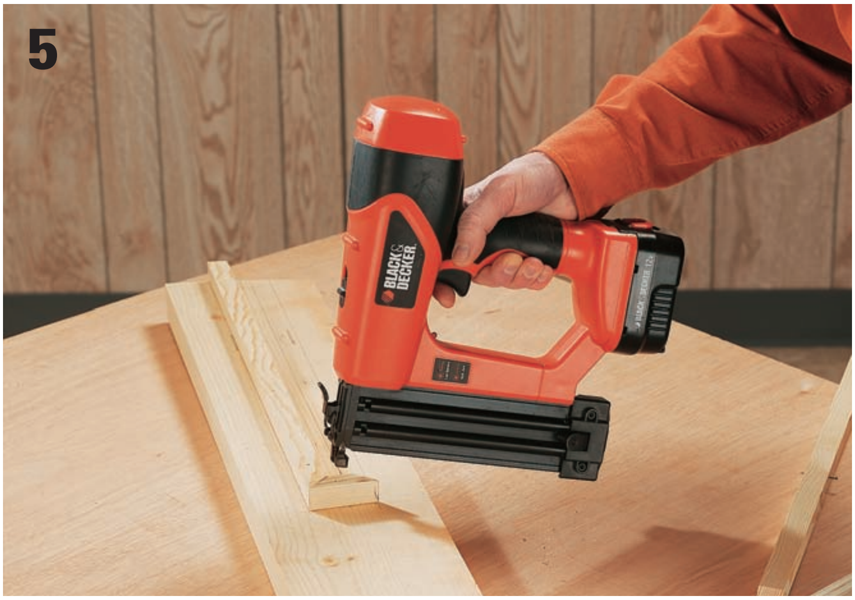
The backs of the benches are made by installing a plywood back board between the uprights and then cladding the backboard on both faces with tongue-and-groove paneling. Start by cutting the cleat that you'll use to anchor the back board from 1× stock. Cut eight cleats (4 for each bench) to 18" and cut four to 2¼". Install a short cleat and a long cleat in an L-shape on the inside face of each upright (photo 5). The top of the long cleat should be flush with the top of the upright.

Using a table saw or a circular saw and shooting board, cut the back panels to size. Apply a bead of wood glue or adhesive and lay the panels into the L-shaped brackets created by the two cleats (photo 6). Drive countersunk 1¼" screws through the back panel and into the long cleat. Install the remaining trim pieces around the plywood seat backer.

CLAD THE BENCHES

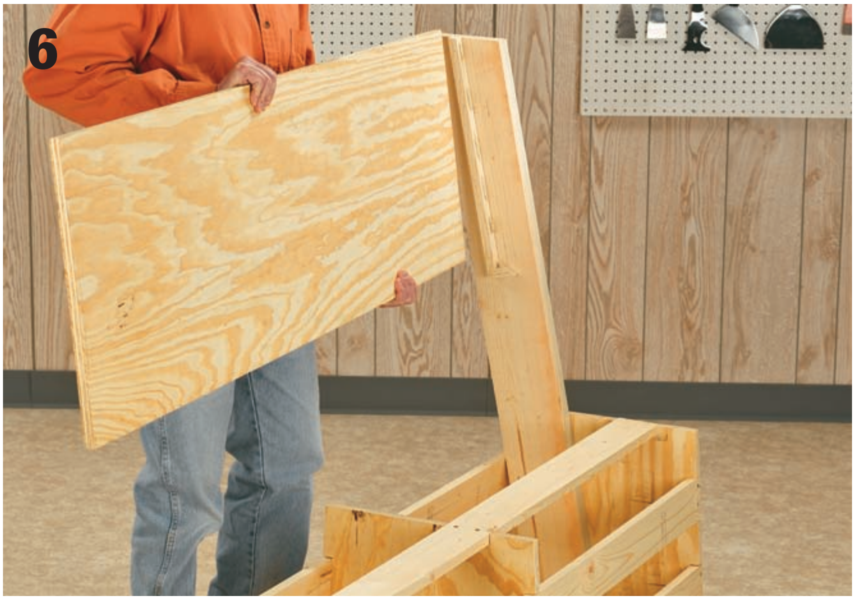
The bases and backs of the benches are clad with pine tongue-and-groove paneling (sometimes called carsiding). Because the paneling on the ends of the benches that face the room conceals their edges, install the paneling that's attached to the bench

5



Fabricate an L-shape to accept the plywood bench back, then attach it to a bench upright.

6



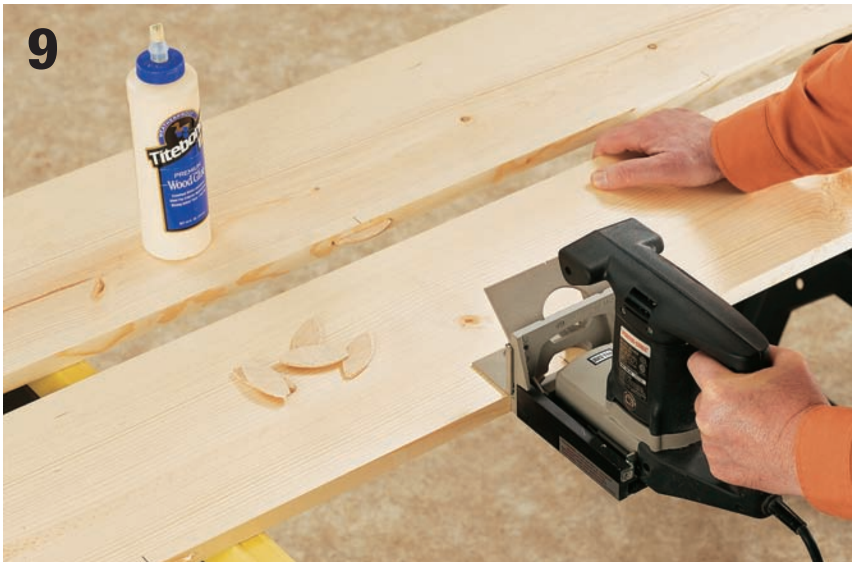
A plywood backer gives the bench back its rigidity. Install the backer using adhesive and fasteners.

along its length first. Cut the first paneling board to length so the bottom end is slightly above the floor and the top ends are flush with the tops of the bench supports (the top ends will be concealed by the seatboard overhang). Then, trim off the groove to create a solid wood edge at the end of the bench. If you own a pneumatic nailer, use it to drive nails through the tongue of the first paneling board. Otherwise, hand-nail with 4d or 6d finish nails and set the heads with a nail set. Drive at least one nail into each strut that the paneling board is positioned over (photo 7).

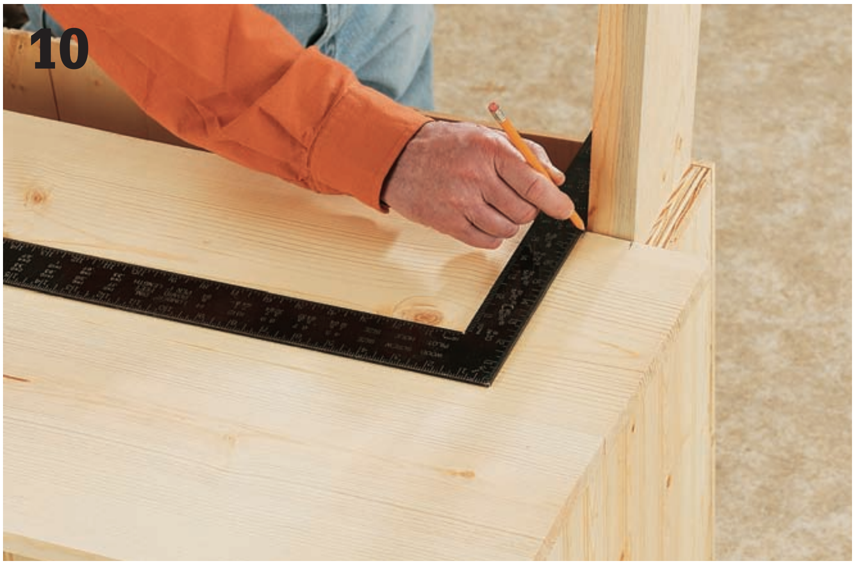
Apply paneling to the front and back of the bench base. To clad the bench ends (you only need to clad the end that will face the room), hold a paneling board up against the end and trace the angled edge onto the back side of the paneling (photo 8). Cut along this line. Install this piece flush to the bench end. Fasten and complete paneling installation for the bench base. Also install tongue-and-groove paneling boards on the front and back sides of each back panel. The boards should be flush with the top and bottom of the plywood back panel.

Begin installing the tongue-and-groove cladding on the base of the bench. You'll find many options, but ⅜"-thick paneling (sold in 14 sq. ft. packages) is an economical choice.

Trace the angle of the tapered bench onto the back side of a piece of paneling and trim it to fit.



Edge-glue two 9" wide boards to make each seat board, and glue up three 10" boards for the tabletop. Use a biscuit joiner to help ensure that the boards are aligned and level.



Mark the cutout locations for the uprights onto the seatboard and cut them with a jig saw.

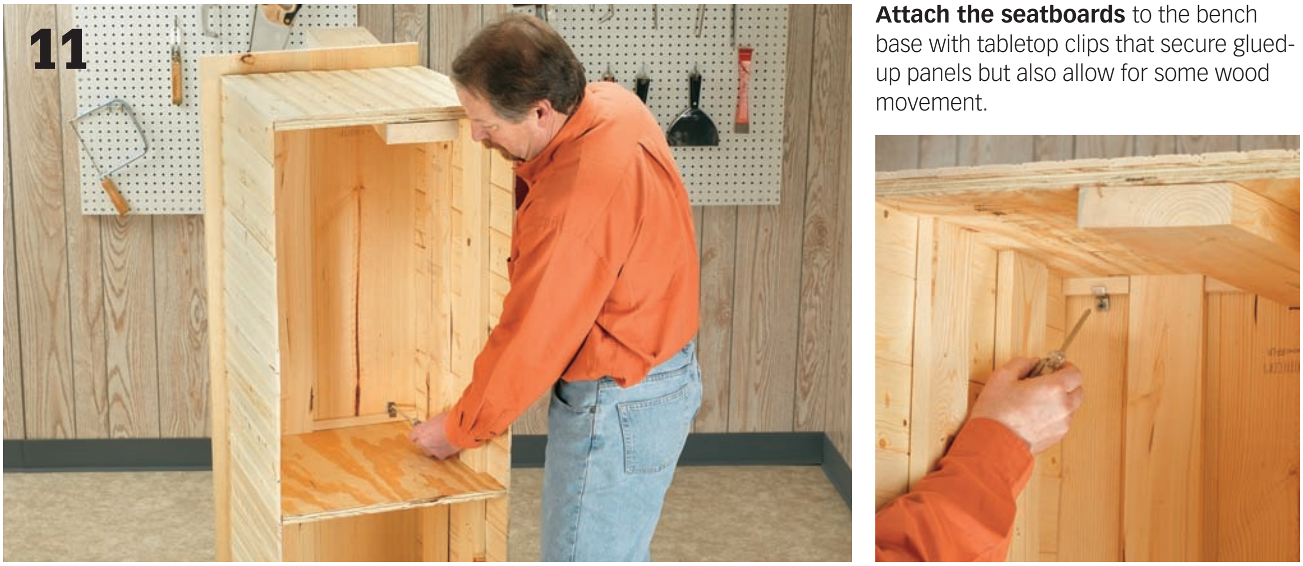
Cut the seat back cap to length from 1 × 8 stock and attach it to the tops of the uprights and to the top of the bench back using glue and nails. The cap should overhang the front upright by about 1½" and be flush with the end of the bench that goes against the wall.

MAKE THE SEATBOARDS & TABLETOP

Both the seatboards and the tabletop are constructed by edge-gluing pine boards together. If you have access to a woodworking shop, you'll want to joint the edges of the boards before you glue them together. Otherwise, make a nice, clean rip-cut along each edge with a sharp circular saw blade. For strength, it is not necessary to use splines, biscuits or dowels to reinforce the edge glued joints, but any of these devices will assist with alignment. We used a biscuit joiner to align the glue-ups for both benches and the tabletop. Use at least three or four pipe clamps with jaw padding to clamp each glue-up together (photo 9).

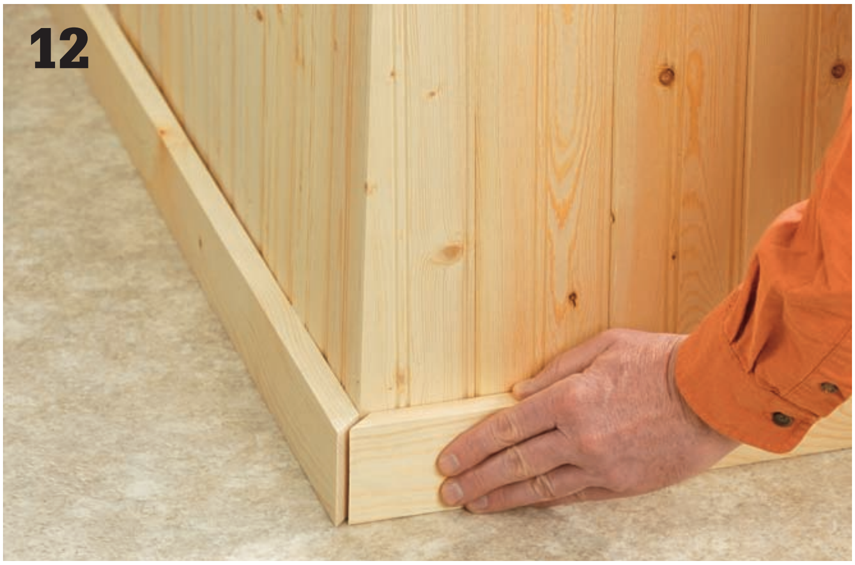
After the glue has dried overnight, remove the clamps and sand the glue-ups to remove any dried glue squeeze-out.

The seat board must be notched to fit around the uprights. Position the boards on the seat base, flush at the wall end and overhanging about 1½" on the room–side end. Mark the location of the uprights onto



11

Attach the seatboards to the bench base with tabletop clips that secure glued-up panels but also allow for some wood movement.



12

There are many tricks you can use to conceal the gap at the bottom of the cladding, as well as the ragged ends of the tongue-and-groove boards. A skilled woodworker would bevel-rip trim moldings and install them with compound miter joints.

the seatboards, then remove them and make cutouts with a jig saw (photo 10).

Tip the bench so the end that goes against the wall is flat on the floor. Attach a pair of tabletop clips to the inside of the bench base near each end, and a couple more on each side. (Tabletop clips are sold at woodworking stores and in woodworking catalogs. They offer a means for fastening tabletops and benchtops, while still allowing for some wood movement.) Attach the seatboard from underneath using the tabletop clips (photo 11).

Set the benches back down in their correct orientation. Cut filler strips of ¾"-thick pine and glue them into the gaps between the uprights and the backs of the benches. Make sure the wood grain on the filler strips has the same orientation as the seatboards.

As a last finishing detail for the benches (other than sanding, painting or staining), attach some type of wood trim to conceal the gap between the tongue-and-groove boards and the floor. If you use very small molding, such as screen retainer or very narrow base shoe, you can probably get away with attaching the molding as is, using butt joints at the corners. But for larger moldings (and for a more professional appearance) you'll need to bevel-rip the molding to allow for the taper of the bench base, as well as make compound miter joints at the corners (photo 12).

13

Cut two identical leg halves, then trim 3" off the back one and face glue it with the front half to make a laminated table leg.

14

Attach the ledger for the tabletop to the wall with heavy-duty fasteners, such as counterbored lag screws driven at stud locations.

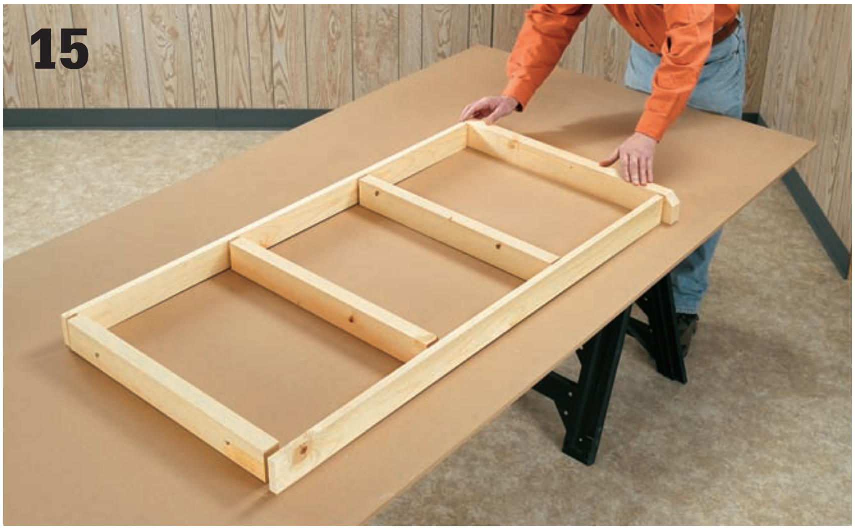
MAKE & INSTALL THE TABLE

The Country Diner table is designed to be affixed to a wall, supported by a ledger board on the wall side while a leg runs to the floor on the entry side. The length and width of the table are adjustable to suit your particular set-up but the fabrication techniques are the same. The dimensions specified in the drawing are 30" wide and 5 ft. long. The top of the table surface is 30" above the floor. Struts cut from 2 × 4 pine are added beneath the table for both looks and stability. We chose to glue up a rustic pine tabletop (which should get many coats of polyurethane varnish). You may prefer to have a tabletop fabricated from solid-surfacing, quartz or natural stone.

Lay out and cut the leg from 1 × 12 pine. The front half of the face-glued leg should run full height (29¼"), tapering from 4" at the top to the full width of the 1 × 12 (11¼") at the bottom. Make the back half-of the laminated leg identical to the front, but then trim off the top 3" to create a ledge for the front tabletop strut (photo 13). Attach the ledgers (photo 14).

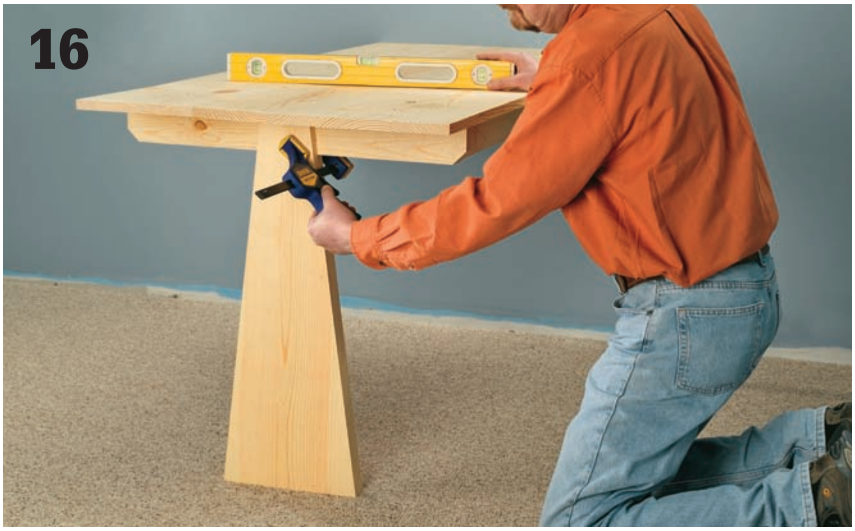
Rip-cut 2 × 4 pine stock to 3" wide to make all four tabletop struts. Also rip-cut some 1 × 4 stock for the two aprons. Cut the front strut to 28" long and then clip the bottom corners to give the table both some "lift" and to create leg room as you enter the booth. Cut the ledger and the inner struts to 24" long. Also cut the aprons to 52¼" long from the 1 × 4 stock. Locate exactly where your table will be fastened to your wall by arranging the location of your benches and then centering the table between them. Using a cardboard cut-out to tailor exactly where you want the

15



Assemble the table frame all at once on a flat surface.

16



Clamp the table leg to the front strut temporarily and check the tabletop for level. Attach the leg to the strut with glue and screws.

table and benches also will help you customize your diner. Once you find the center of the table location, find the center of the ledger board and mark it. When installing the ledger board, line up these two marks for a perfect fit. At the ledger board location, strike a level line 29¼" above the floor. Find and mark the wall stud locations—try to locate the ledger so it spans two studs. Install the ledger on layout using glue and the proper fasteners (photo 14). Ideally, use a ⅜" × 3½" counterbored lag screw driver through the ledger and into wall studs, plus additional screws and/or toggles to stabilize the ledger.

On a flat surface, assemble the table frame by capturing the short struts between the aprons (photo 15). The front strut should be attached to the aprons with L-brackets on the inside joint.

Attach the tabletop to the struts with one tabletop clip near each end of each strut. Clamp the leg to the front strut and rest the other end of the tabletop on the wall ledger, which should fit between the free ends of the aprons (photo 16). Adjust the height of the leg if necessary, and then attach it to the front strut with glue and screws. Drive screws through the aprons into the ends of the ledger.

APPLY FINISH, POUR COFFEE

The Country Diner is shown here with a light wood stain and high gloss polyurethane finish for ease of cleaning. Let all adhesives, finish and paint dry thoroughly before sitting down at the Country Diner for a slow home-cooked breakfast and time well spent with family and friends.

Wall Niche

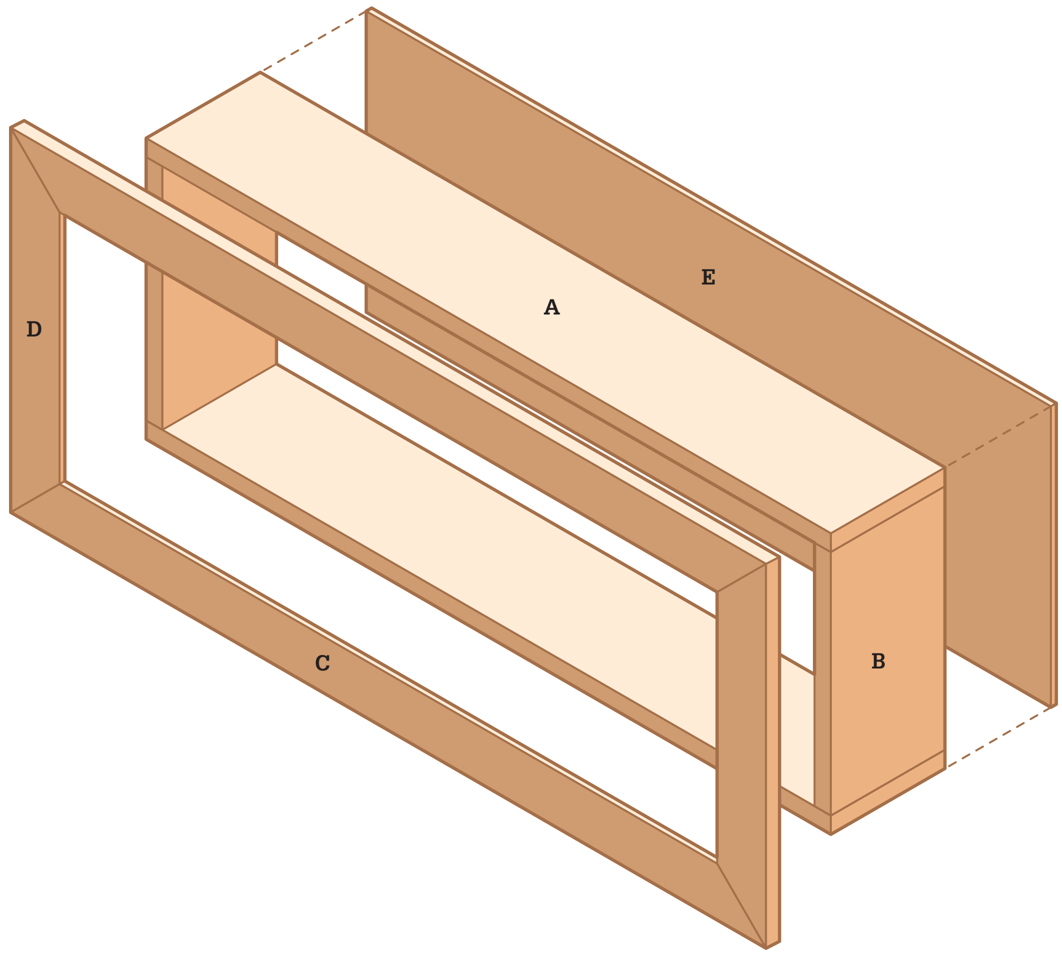
A wall niche is kind of cubby hole carved into a stud wall, usually to house display shelving. These days, they are often seen as prefashioned inserts with an arch shape and Greco-Roman styling in higher-end housing, often with classical statuary within the niche sides. The niche shown here is a rather different animal. It is simply a wooden box that you slip into a hole in the wall and then trim out. As a quick and easy storage project, it is a perfect accompaniment to our Fast Country Diner project (see pages 102 to 111).

A niche creates a perfect spot to stash napkin holders, salt and pepper shakers and other tableware so your table surface is clear for eating, relaxing or doing a bit of homework.

The steps, skills and tools described here can be used to create wall niches of various sizes and in numerous locations. It is important to note, however, that these niches are intended for non-load bearing walls. If the niche you wish to create would involve cutting framing members in a load bearing wall, consider redesigning the project so you do not have to cut wall studs. Making structural alterations to a load-bearing wall should be done only by qualified professionals.

It's also important to be aware of any electrical wires or gas or water plumbing near your project area. Check to see if there are light switches or plugs above or below the niche opening before cutting and try to deduce where plumbing might be routed and located.

Safety Notice: This project should be installed only in non-loadbearing walls. Do not cut wall studs in load bearing walls unless you are working with a certified building engineer or professional carpenter.



Tools

- Drywall/plaster cutting saw
- Reciprocating saw
- Cordless drill/driver
- Circular saw
- Miter saw
- Countersink
- Drywall finishing tools
- 2-foot level
- Aviator snips

Materials

- 1 × 6
- Trim-head screws
- ¼" birch plywood scrap
- 1⅝" drywall screws
- Case molding
- Paint

Cutting List

Part	**No.**	**Desc.**	**Size**	**Material**
A	2	Top/bottom	¾ × 3⅝ × 25½"	Hardwood/MDF
B	2	Side	¾ × 3⅝ × 8"	Hardwood/MDF
C	1	Back	¼ × 9½ × 25½"	Plywood
D	4	Trim (opt.)	½ × 2⅞" × miter to fit	Case molding

How to Build a Wall Niche

LAY OUT THE NICHE

Determine that the wall you're cutting into is not a load-bearing wall. Determine the opening's finished location and height and width. An 8" tall by 24" wide niche is just the right scale for the kitchen booth project we designed this niche to accompany (see page 102). Use a 2-ft. level and mark all four sides of the opening plumb and level at the finished location. These lines are the control points for all other measurements.

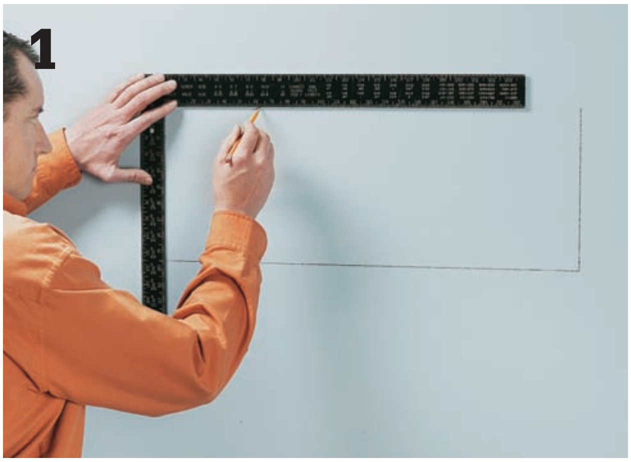
Measure ¾" out from each control point line (photo 1). Do this at two points on each line and connect the dots using a 2-ft. level.

MAKE THE CUTOUT

Turn off electrical power at the main circuit breaker. Use a drywall saw or reciprocating saw to cut along the cut line. Make the cut as shallow as you can in case there are hidden wires or pipes in the wall (photo 2).

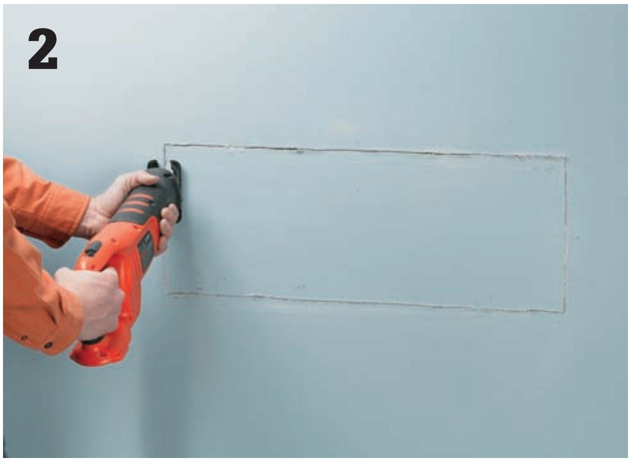
Remove the drywall, exposing the wall studs. More than likely, you're going to have a wall stud or two somewhere in the middle of the opening. Use a reciprocating saw to remove the studs. Or, you can use a circular saw to start the cut (photo 3a), carefully aligning it with the edge of the drywall and using it to cut the stud. Then, finish the cut with a reciprocating saw (photo 3b). Be careful not to cut through the drywall on the back side of the cut.

1



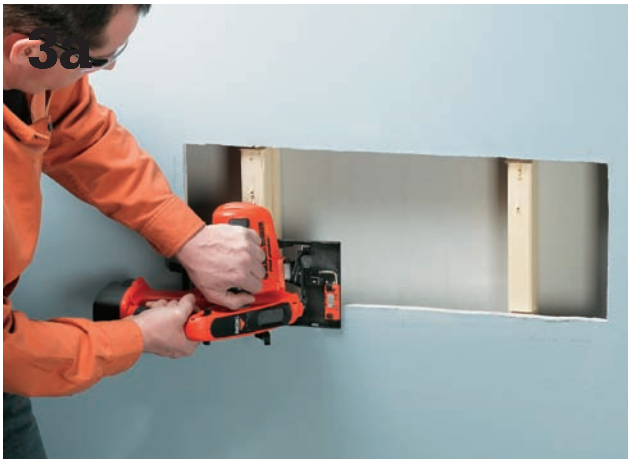
Start your layout by mapping out the niche's finished dimensions, then measure out from there for the rough opening where you will make your cuts. This is the cut line.

2

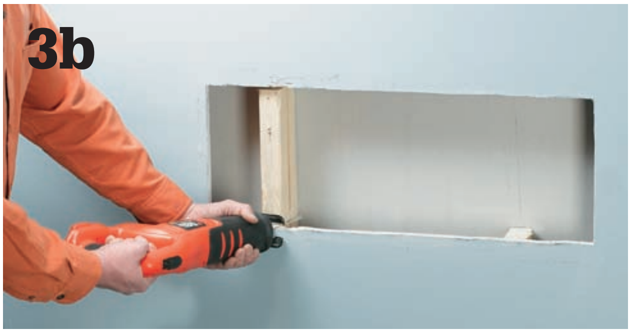


With electrical power turned off, cut the opening in the wall covering. Use caution in case there are hidden wires or pipes in the area.

3a



3b



Use a circular saw to start the stud cut, then use a reciprocating saw to finish the cut. This method is easier on the drywall—especially if the studs back up to another room—and provides a straighter cut.

Rip-cut the niche frame boards to width. Cutting them so they stop just short of the opposite wallcovering when installed.

Assemble the niche box. Drill countersunk pilot holes for the screws.

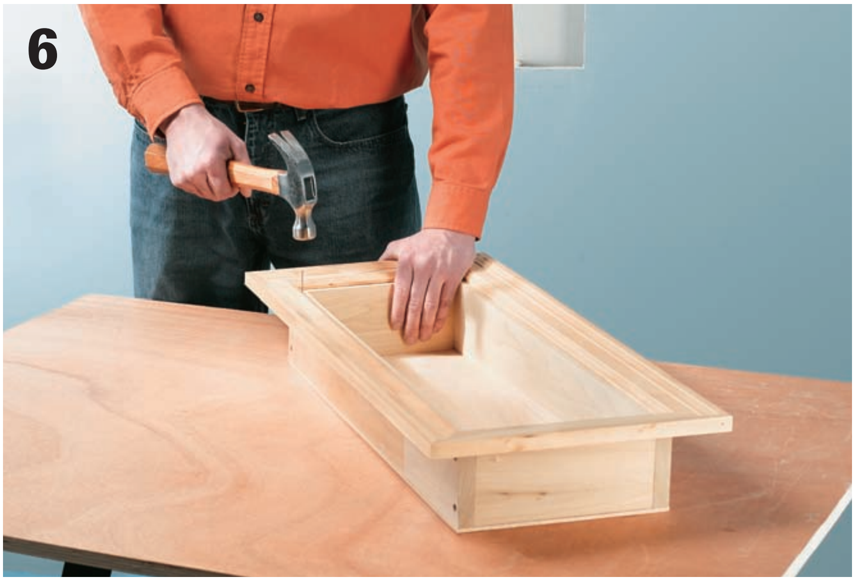
When removing studs, you may pull a fastener through from an adjoining room and have to repair that afterwards. Nails or screws may be penetrating from the other side of the wall into the stud. Carefully remove the stud section. It is likely that removing the stud section will cause the fastener to pull through the opposite side of the wall, so touch-up may be necessary. For most non-loadbearing walls the competed niche box should provide adequate support for the cut studs. But if you are cutting more than one stud, or if you simply want to be certain the niche box does not sag from downward pressure, make the opening larger and install a 2 × 4 frame to house the niche box. This will require considerably more patching of the wall covering, but you may appreciate it for your own peace of mind.

BUILD THE NICHE BOX

Measure the depth of your wall cavity and subtract ½" from the overall depth to give yourself a little bit of flexibility when installing the niche and to allow for the thickness (¼") of the backer material. This measurement yields the required width of the boards you'll use to make the niche box. Rip-cut 1 × 6 × 8 lumber to the required width, using a tablesaw or a circular saw with a straightedge guide (photo 4). Cut the frame parts to length.

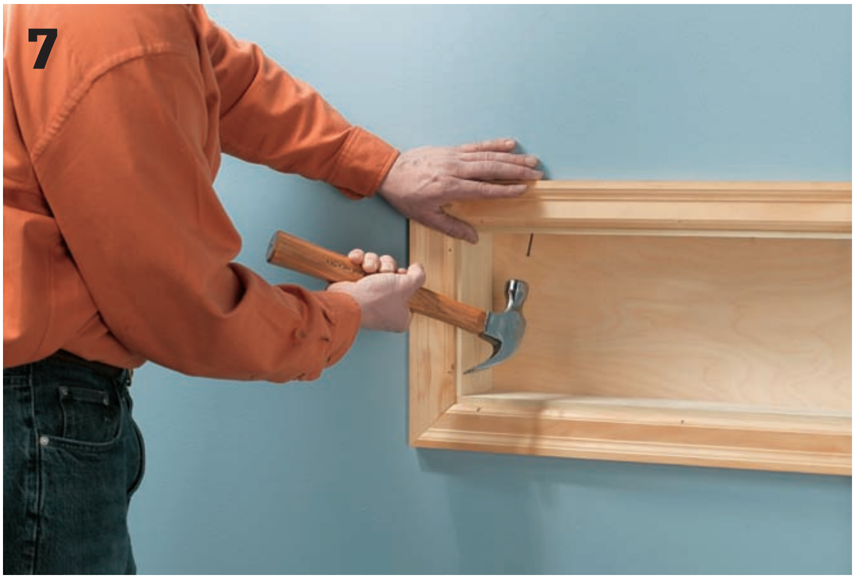
Fasten top and bottom niche frame parts to the sides with drywall screws or trim-head screws driven into countersunk pilot holes (photo 5). Cut the backer board to size and attach it to the back edges of the frame with drywall screws or finish nails. Install backer material (9½ × 25½") with drywall screws.

6



Use standard casing to trim out the niche like a picture frame. Pre-installing the trim means you can slip the niche box assembly into the opening and the trim guides how the box sets against the wall, similar to how a pre-hung door is installed.

7



Fasten the niche box up into the stud ends with finish nails.

Cut trim moldings (such as door casing or picture frame molding) to fit the niche box. For the most satisfying results, choose a molding style and approach that reflects the molding scheme already in the room. Fasten the trim to the niche box with finish nails and glue or panel adhesive (photo 6). Run a small bead of caulk/adhesive on the face of the niche box. Nail casing to niche box.

INSTALL THE NICHE BOX

The niche box is fastened through the interior walls of the box to the ends of the stud(s) you removed. It can also be fastened to blocks you install in the wall cavity on each side. Locate each stud and transfer its location to the interior of the box and mark it.

Test-fit the niche box to make sure it lays flat against drywall. When you have established that the fit is good, run a bead of caulk/adhesive on the backsides of the trim pieces.

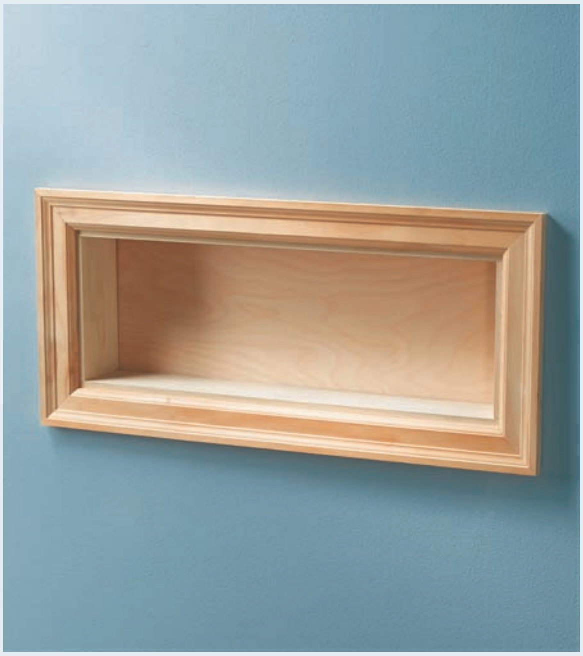
Insert the niche box into the opening. Press firmly so the trim squeezes into the adhesive.

Pre-drill holes at stud locations and fasten with a pair of 6d finish nails driven through the frame boards and into the ends of the cut wall studs (photo 7).

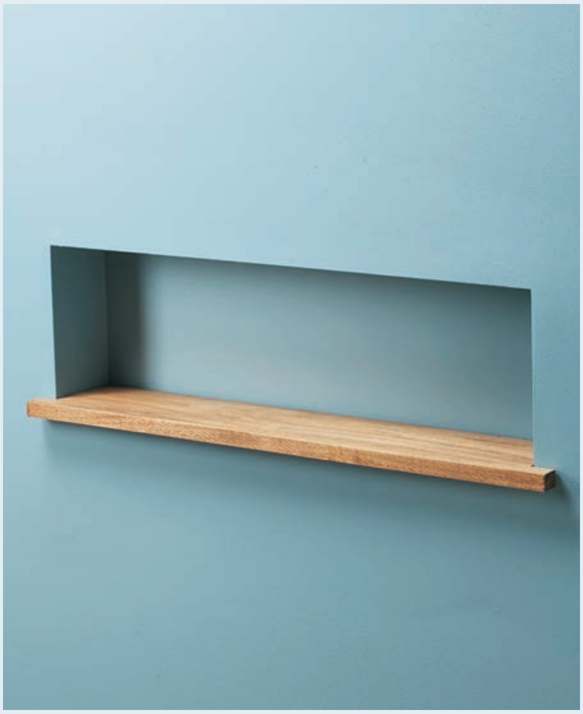
Fill and sand fastener holes. Sand and caulk as necessary. Prime and paint or apply another finish of your choice.

Options for Making a Wall Niche ▸

One key to cutting in a wall niche is to understand that you must cut a larger hole in your wall than the finished dimensions of the wall niche. So first, you determine the niche's finished location and opening dimensions and mark them out on the wall. You then measure from those lines so that the niche box fits inside the wall. Although making the niche so it fits precisely within a stud bay has some built-in efficiencies, it is not necessary. As you'll see in this project, as long as you're building in a non-loadbearing wall you can locate your niche just about anywhere you choose. Three options for trimming out a wall niche are described here. The first is to frame a wood niche insert with picture-frame trim. The second is to use a drywall wrap created with blocking inside the wall cavity and finished with joint compound to blend with the surrounding wall. The third option simply involves installing a prefabricated product.



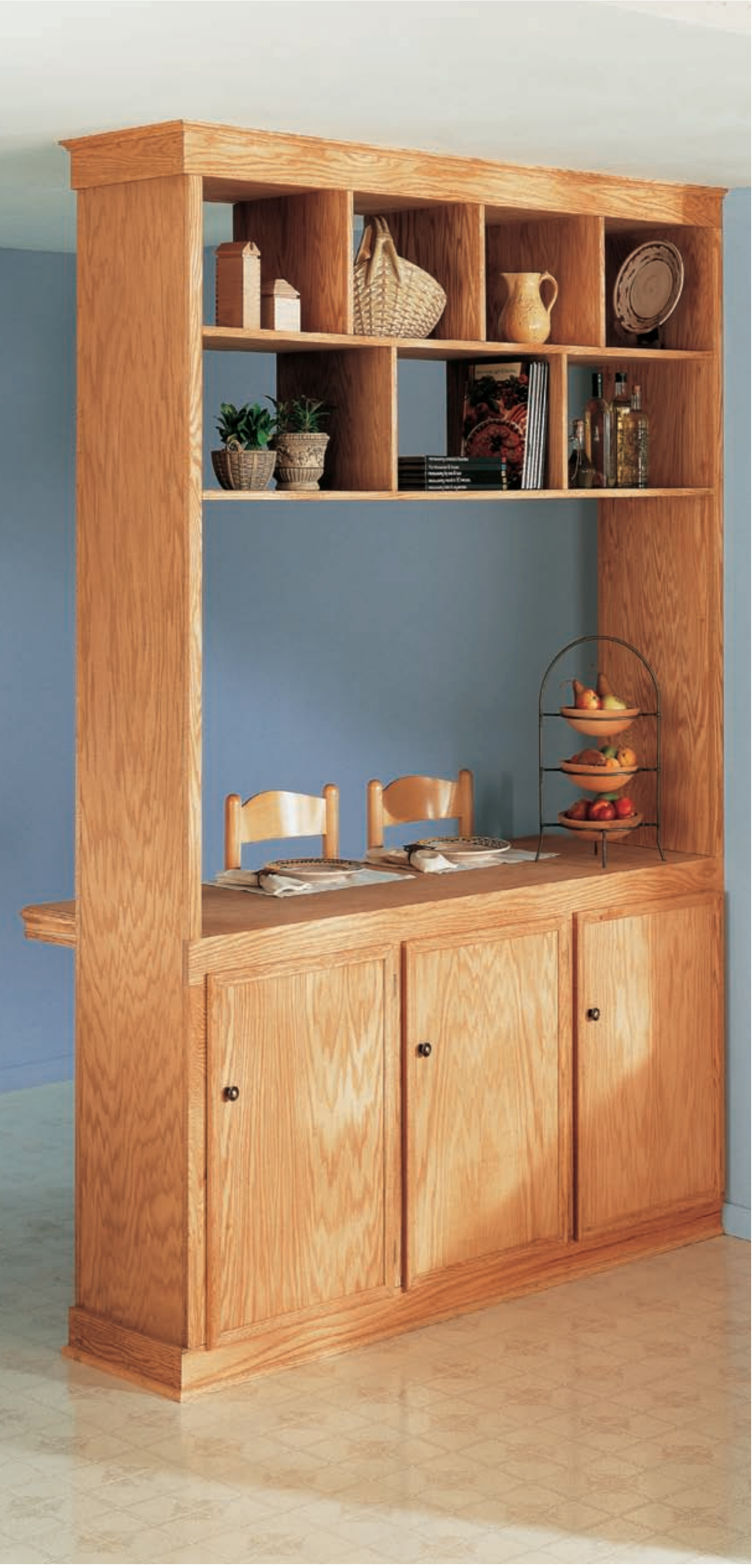
Build your niche completely out of wood, insert it into a hole cut in the wall and trim it with picture molding (as seen on previous pages).



Frame the niche opening and install a wood shelf at the bottom, then trim out the opening with wallboard using common taping and finishing techniques.

Purchase a prefabricated wall niche from an architectural millwork supplier and install it in a properly sized wall opening.

Room Divider



A room divider, like a partition wall, separates one large room into two usable spaces, each with its own specific function. But unlike a partition wall, a room divider adds storage space to your home, while letting you retain the open feeling of a larger room.

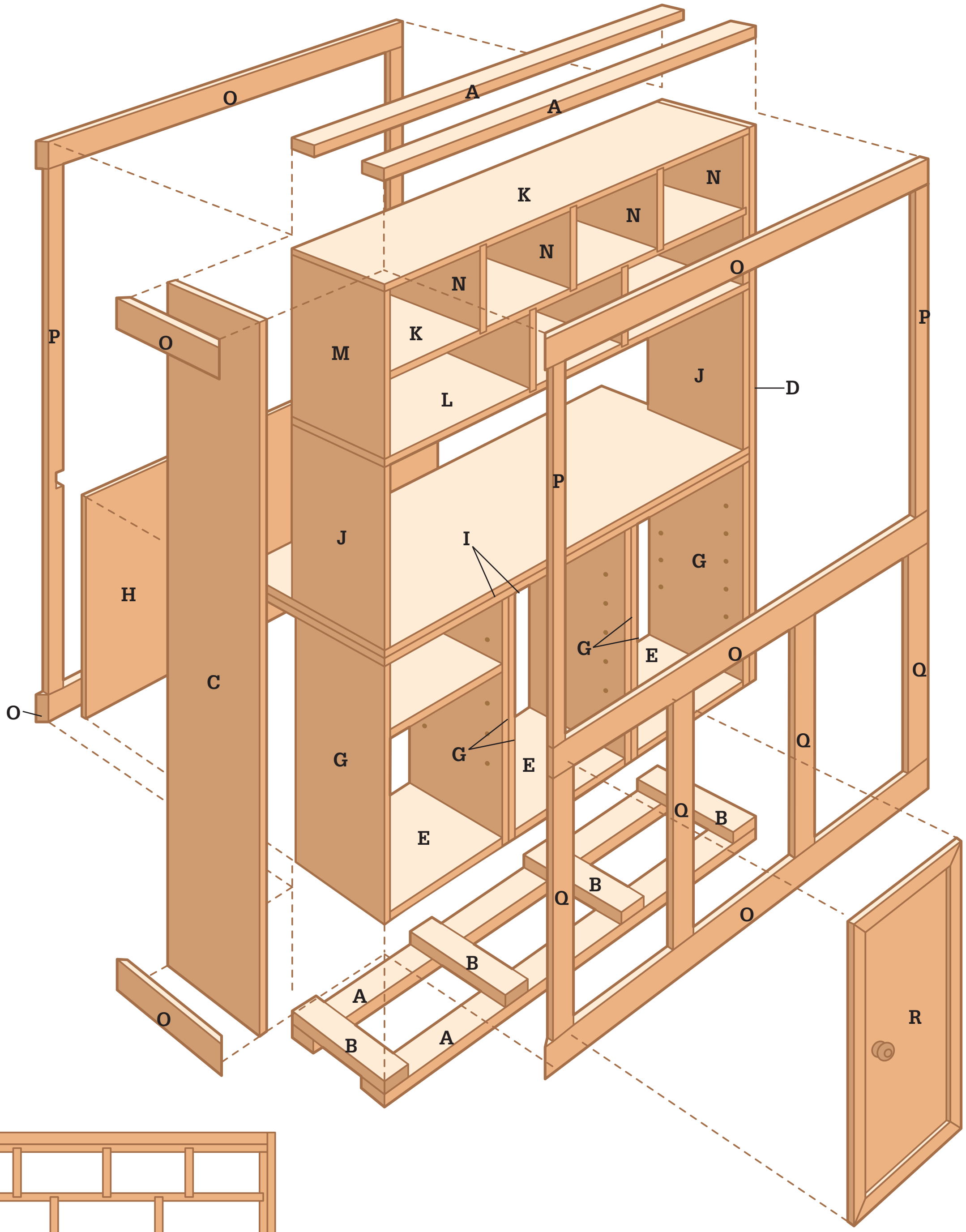
Room dividers commonly are used to separate a large kitchen/dining area into two different "rooms." Adding a pass-through and overhanging countertop, as in the project shown here, creates a casual dining area.

In the design featured here, the room divider is built in two main sections: the base cabinet with countertop, and the upper shelf unit. The two sections are joined by a floor-to-ceiling plywood framework to create one attractive built-in.

A room divider lends itself to personal touches, like mounting a wine rack and stemware racks on the underside of the shelf unit to make a convenient dry bar.

The overhanging countertop gives this room divider an added dimension as a convenient dining surface located near the food preparation area of the kitchen. The cabinets on the kitchen side of the room divider also provide accessible storage space for pots, pans, and kitchenware. The open shelves in the upper half of the room divider are ideal for displaying glassware or collectibles.

We designed this room divider with a built-up plywood countertop that has a polyurethane varnish finish. This is an economical and perfectly appropriate solution. But if you're looking to spice up the design a bit, consider replacing the countertop with a higher-end countertop material, such as granite or solid-surfacing. You'll be amazed at how much difference a few well-chosen design highlights can make in the overall appearance of the project.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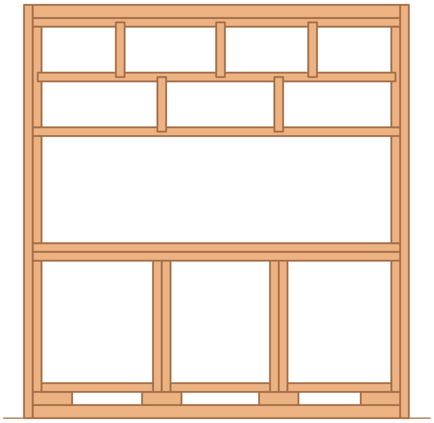


Construction Detail, Front View

Tools

Stepladder
Pencil
Level
Tape measure
Plumb bob
Framing square
Router with ¾" straight bit
Circular saw or table saw
Handscrew clamps
Bar clamps
Drill/driver and bits
Screwdriver
Hammer
Nail set
Putty knife

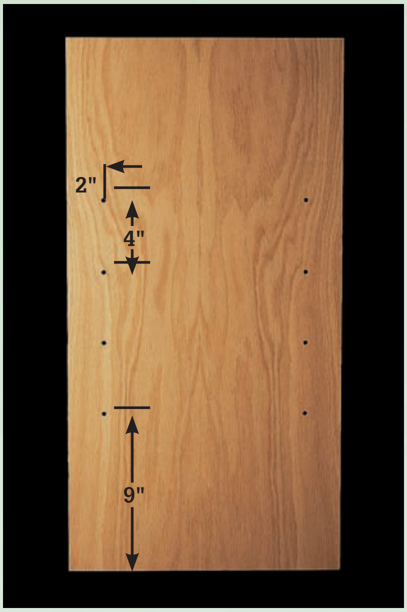
Materials

Wood glue
Finish nails (1", ¼", 2")
Screws (1", 1¼", 2", 2½", 3")
Shims
¾" hardwood strips
Countertop trim
Shelf-edge trim
Pin-style shelf supports
Finishing materials
Door hardware
5) 2 × 4" × 8 ft. pine
5) 1 × 4" × 8 ft. oak
4) 1 × 2" × 8 ft. oak
1) ¼ × 4 ft. × 8 ft. oak plywood
4) ¾ × 4 ft. × 8 ft. oak plywood

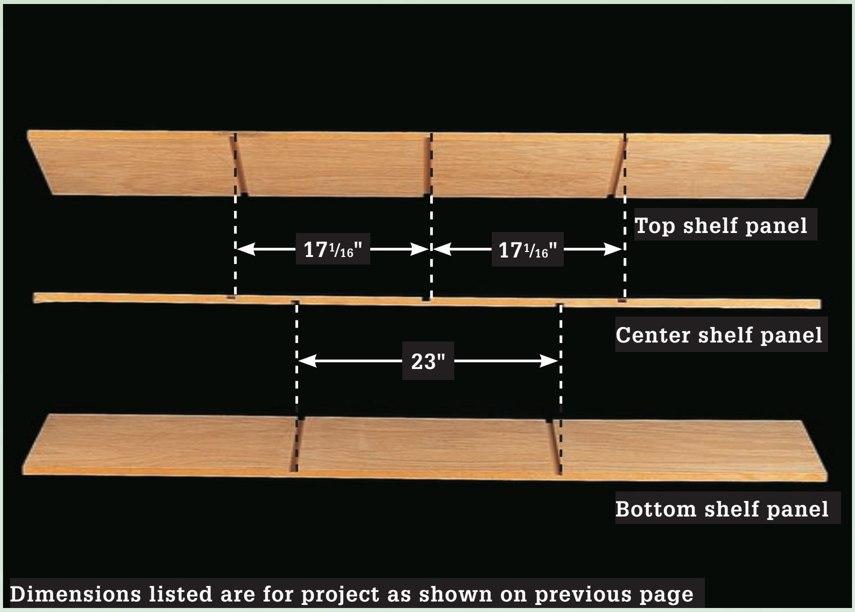
Cutting List

Part	No.	Desc.	Size	Material
A	4	Top and sole plates	71¼"	2 × 4
B	4	Sole plate cross braces	15"	2 × 4
C	1	Outer end panel	95½" × 15"	¾" oak plywood
D	1	Inner end panel	91" × 15"	¾" oak plywood
E	3	Base panels	22" × 14¾"	¾" oak plywood
F	3	Cabinet shelves	21¾" × 14¾"	¾" oak plywood
G	6	Cabinet risers	30" × 14¾"	¾" oak plywood
H	1	Cabinet back panel	32" × 70"	¼" oak plywood
I	2	Countertop panels	70½" × 24"	¾" oak plywood
J	2	Shelf unit supports	33" × 15"	¾" oak plywood
K	2	Top, bottom shelf panels	70½" × 15"	¾" oak plywood
L	1	Center shelf panel	69¾" × 15"	¾" oak plywood
M	2	Shelf unit sides	25½" × 15"	¾" oak plywood
N	5	Shelf unit risers	12½" × 15"	¾" oak plywood
O		Face frame rails	33 linear ft.	1 × 4 oak
P		Face frame stiles	26 linear ft.	1 × 2 oak
Q		Face frame stiles	12 linear ft.	1 × 3 oak
R		Overlay doors	see pages 46 to 47	

ROOM DIVIDER PROJECT DETAILS

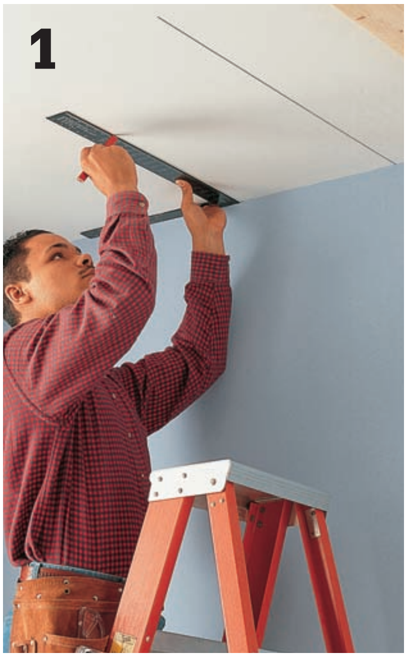


Cabinet risers, cut from ¾" plywood, have holes for pin-style shelf supports drilled at 4" intervals, 2" in from edges of each riser face. Holes start 9" from top and bottom.

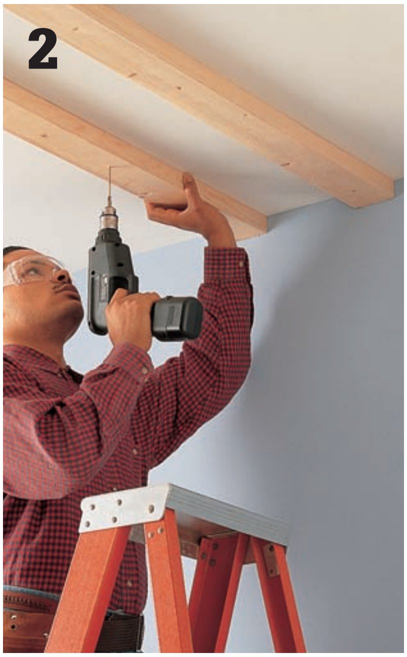


Shelf-unit panels, cut from ¾" plywood, have ¾"-wide by ⅜"-deep dadoes to hold the shelf risers. The center shelf panel is dadoed on both the top and the bottom faces, and the top and bottom shelf panels are dadoed on one face only.

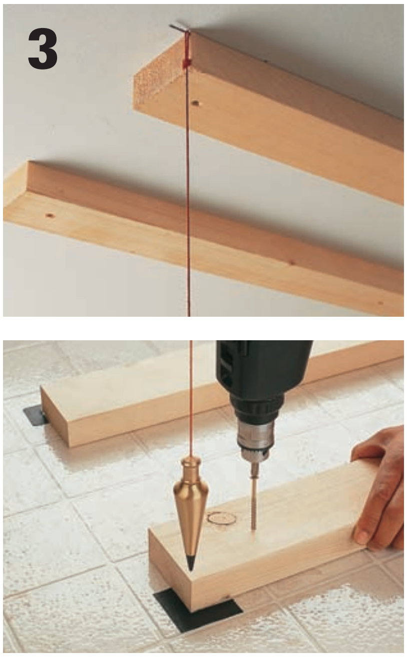
How to Build a Room Divider



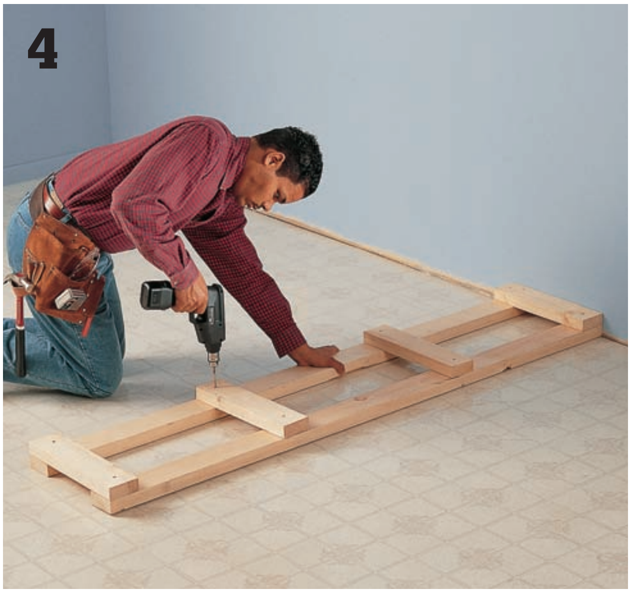
Mark the location for the top plates on the ceiling, using a framing square to ensure that lines are perpendicular to the wall. Locate wall studs and ceiling joists in the project area, and install blocking if necessary.



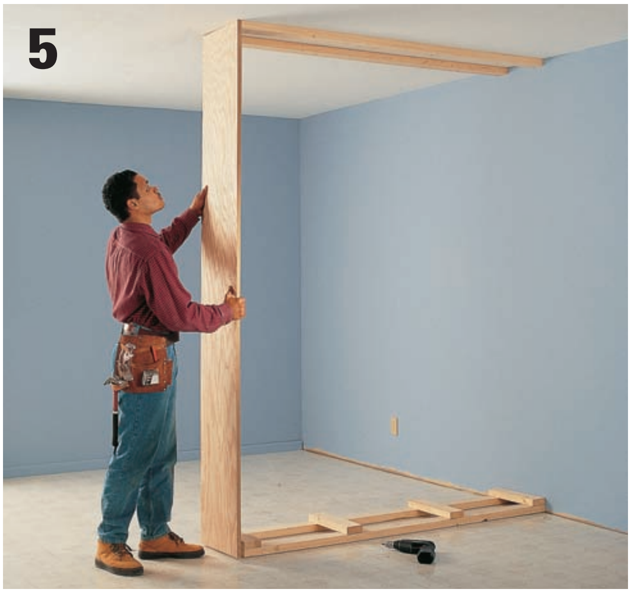
Cut two 2 × 4 top plates and position them against the ceiling, with the outside edges flush against the reference lines. Check to see if plates are level, and install shims if needed. Anchor plates to ceiling joists or blocking, using 3" screws.



Cut two 2 × 4 sole plates, and align them directly under the top plates, using a plumb bob as a guide. Check to see if plates are level, shim if needed, then anchor the sole plates to the floor, using 3" screws.

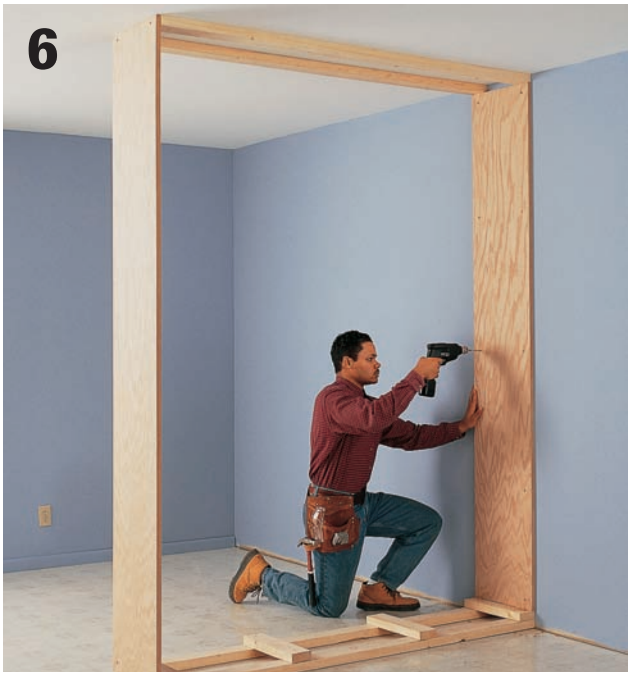


Cut and attach 2 × 4 cross braces across the sole plates, using 2½" screws. Position the cross braces at the ends of the sole plates, and below the planned cabinet riser locations.



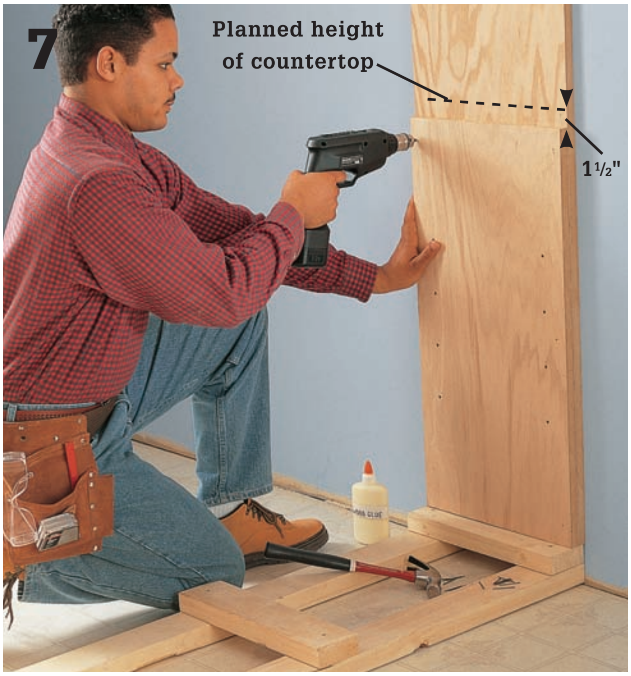
Measure and cut the outer end panel ½" shorter than the floor-to-ceiling height to allow for adjustments. Align end panel with the edges of the 2 × 4 plates, then attach it to the top and sole plates, using 2½" screws driven into counterbored pilot holes.

6



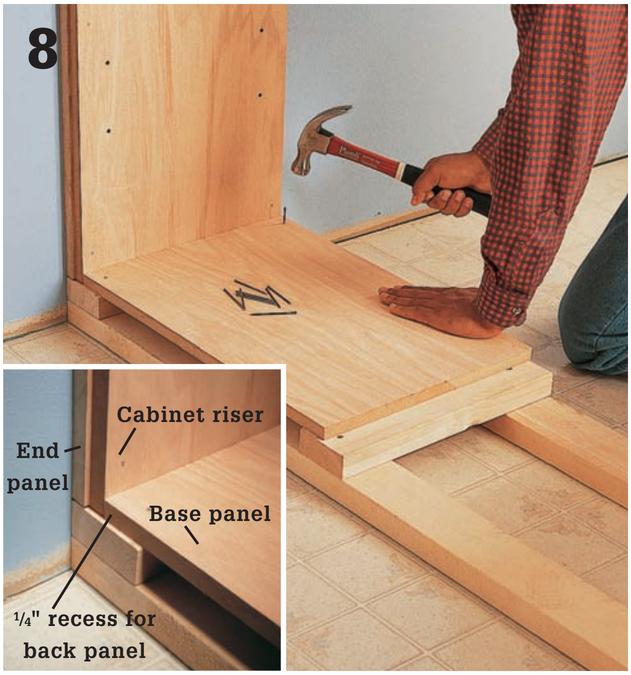
Measure and cut the inner end panel ½" shorter than the distance between the top plate and sole plate cross braces, and slide it in place. Align the panel with the edges of the top plate and sole plate cross braces, then attach it to the wall with 2½" screws driven into wall studs or blocking.

7



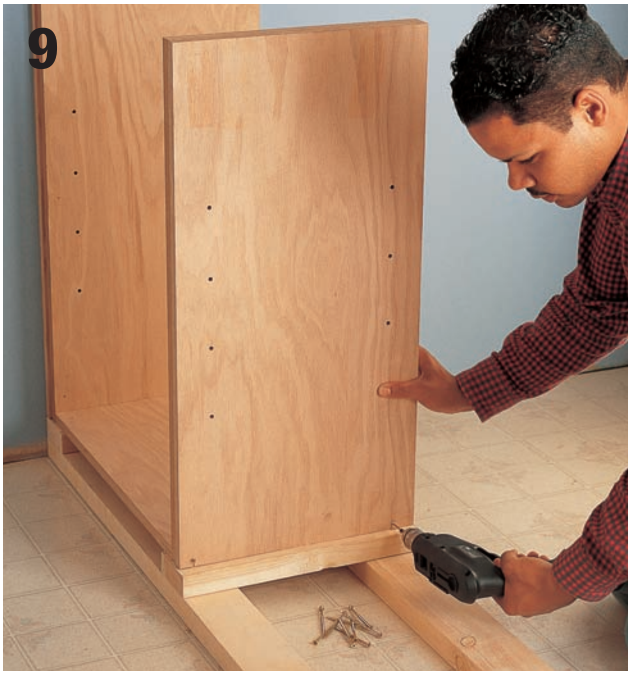
Measure and cut plywood cabinet risers with holes for shelf supports (see Project Details, page 120). Risers should be ¼" narrower than end panels, and 1½" shorter than the distance from sole plate cross braces to planned countertop height. Attach a riser to each end panel, flush with the front edge, by driving 1¼" screws through counterbored pilot holes.

8

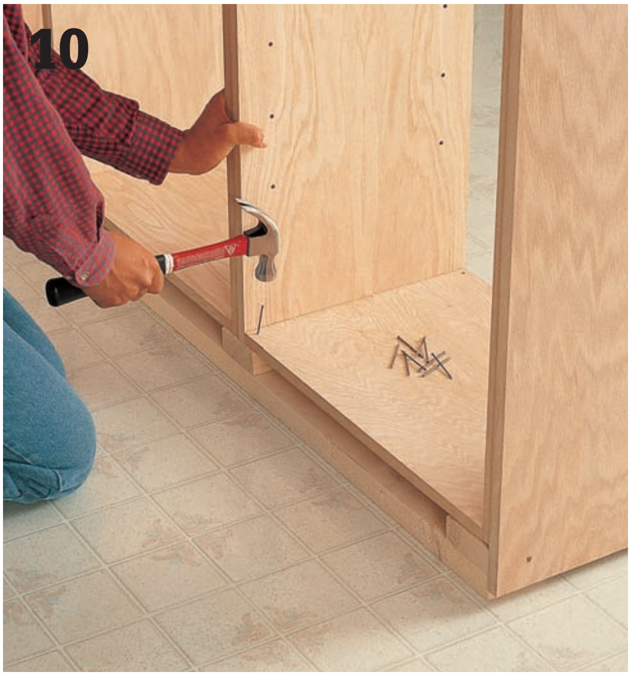


Measure and cut plywood base panels the same width as the risers. Lay one base panel across the sole plate cross braces, butted against the riser at the inner end panel, with the ¼" recess at the back side (inset). Attach the base panel, using 2" finish nails.

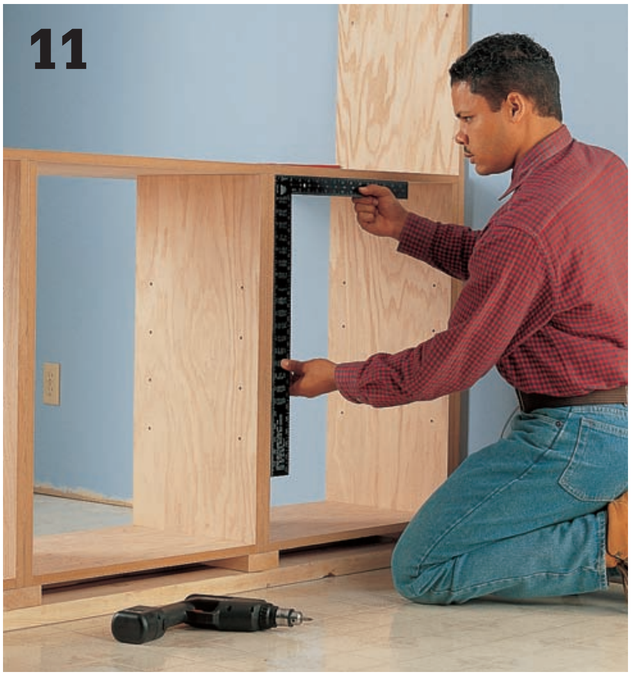
9



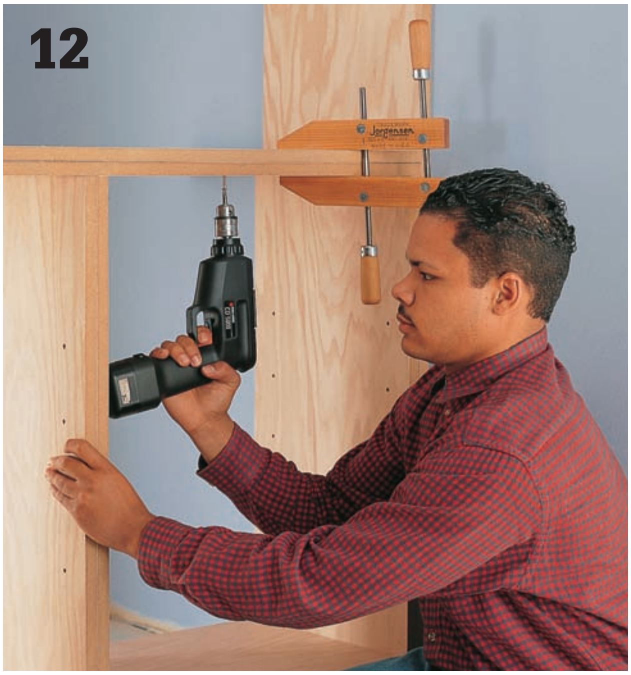
Make riser assemblies (for inner riser locations) by joining two risers together, back-to-back, with glue and 1¼" finish nails. Set one riser assembly on the cross brace next to the first base panel, and attach it with 2½" screws driven through pilot holes and into the base panel edge.



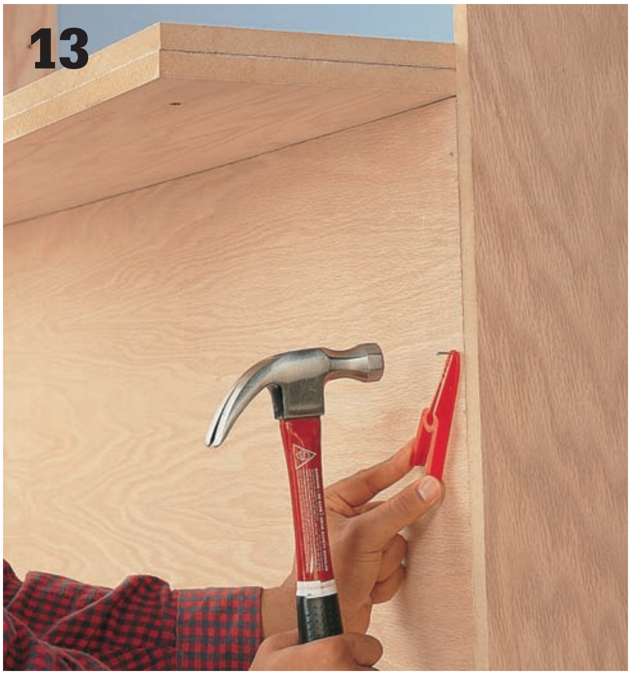
Install the middle base panel, then the second riser assembly, then the last base panel, using the techniques shown in steps 8 to 9.



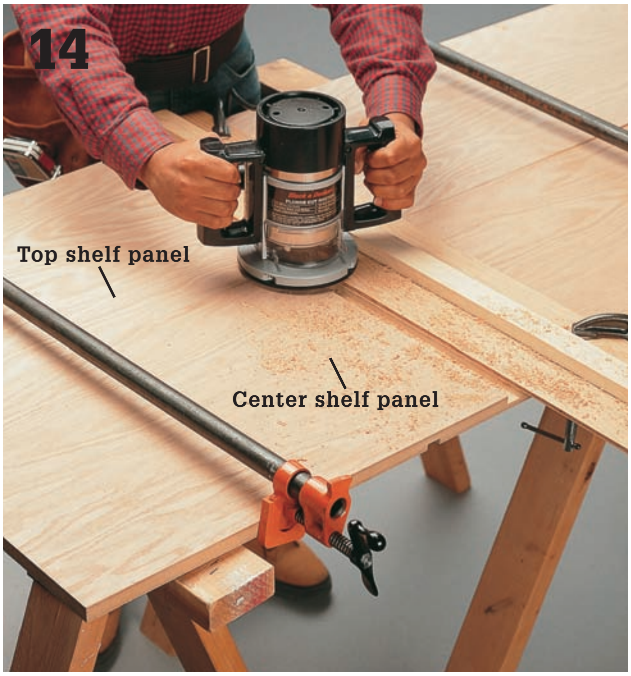
Measure and cut two plywood countertop panels, 24" wide, to fit between the end panels and set the first panel on the cabinet risers, flush with the front edges of the end panels. Use a framing square to adjust the risers so they are perpendicular to the countertop, then drill pilot holes and drive 2½" screws through countertop and into risers.



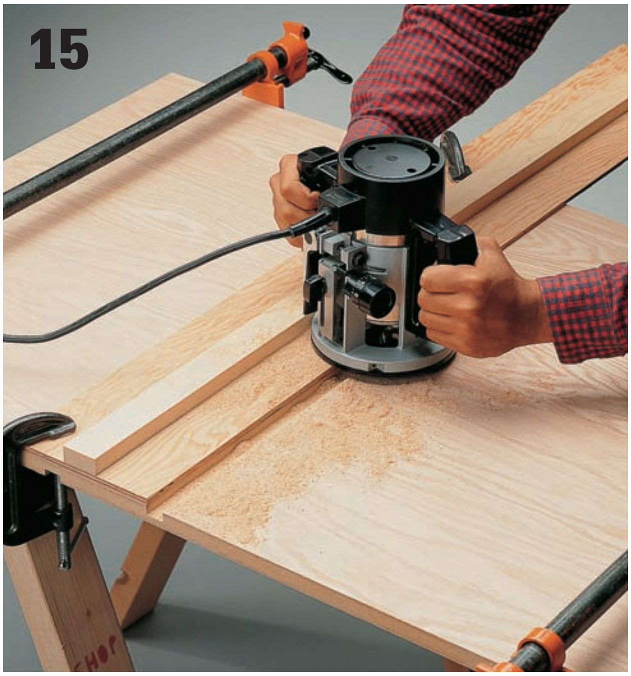
Apply glue to the top of the first countertop panel, then set the second countertop panel on the first panel. Clamp the panels together, then join them by driving 1" screws up through the underside of the first panel.



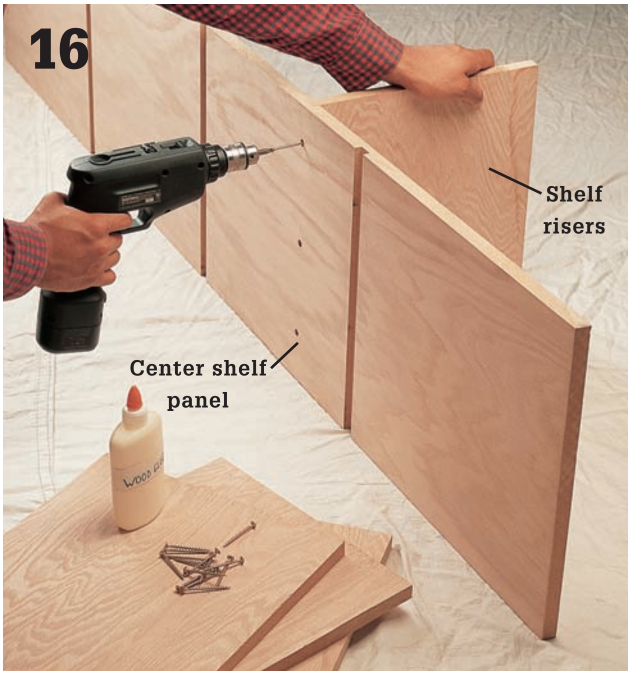
Measure and cut a ¼" oak plywood back panel to fit into the recess created by the back edges of the risers and base panels (see step 8). Set the back panel into the recess, then attach it to the cabinet risers and base panels, using 1" wire nails driven at 8" intervals.



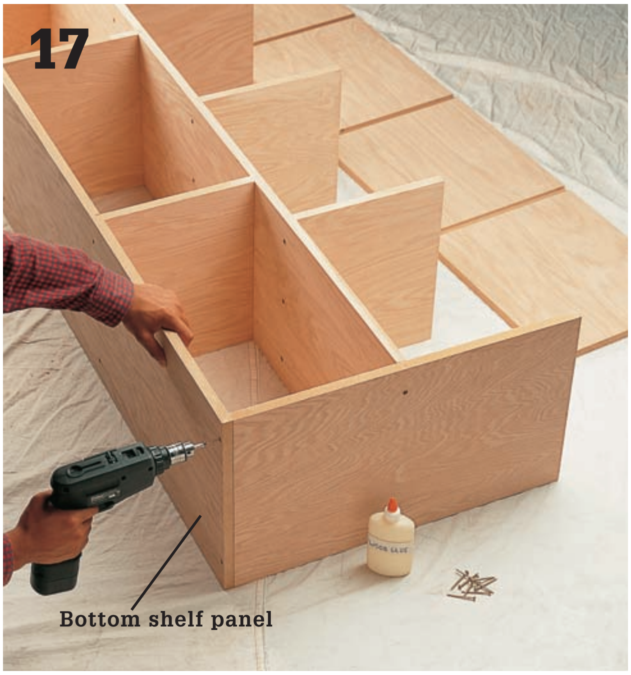
Measure and cut plywood shelf panels for the upper shelf unit, then cut ¾"-wide, ⅜"-deep dadoes at shelf riser locations (see Project Details, page 120). Tip: "Gang-cut" dadoes to speed up your work: mark locations for dado cuts on panels, then clamp them together so dado marks align.



Measure and cut plywood shelf unit sides. Make a ¾"-wide, ⅜"-deep dado in each side, where the center shelf panel will fit.

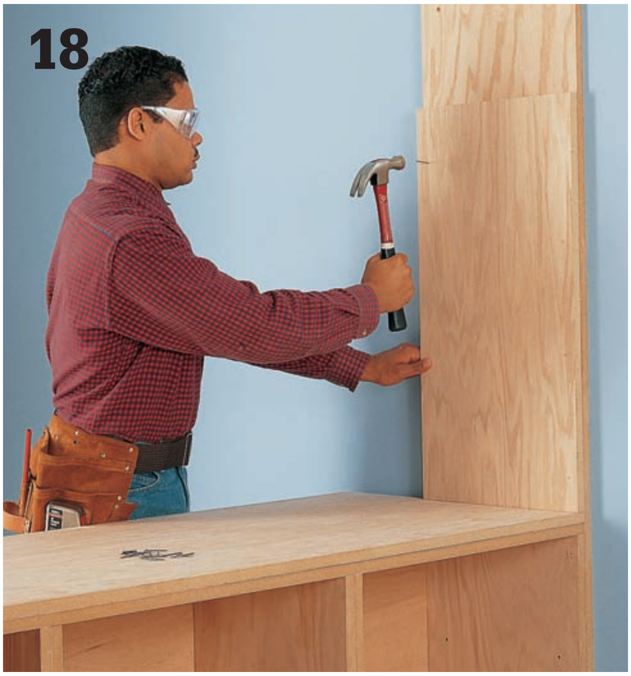


Measure and cut plywood shelf unit risers the same width as the center shelf. Stand the center shelf panel on its side, then glue the shelf risers into dadoes. Reinforce the joints with 2" screws driven into counterbored pilot holes.



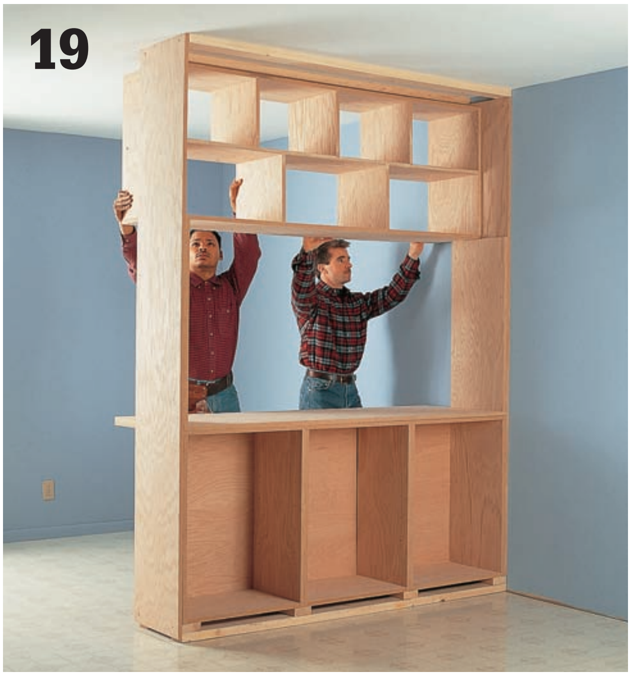
Assemble the remaining pieces of the upper shelf unit, using glue and 2" screws driven into counterbored pilot holes. Attach side panels to center shelf, then attach top and bottom shelf panels to side panel and shelf risers. Make sure diagonal measurements of shelf unit are equal (if not, adjust unit as needed until it is square).

18



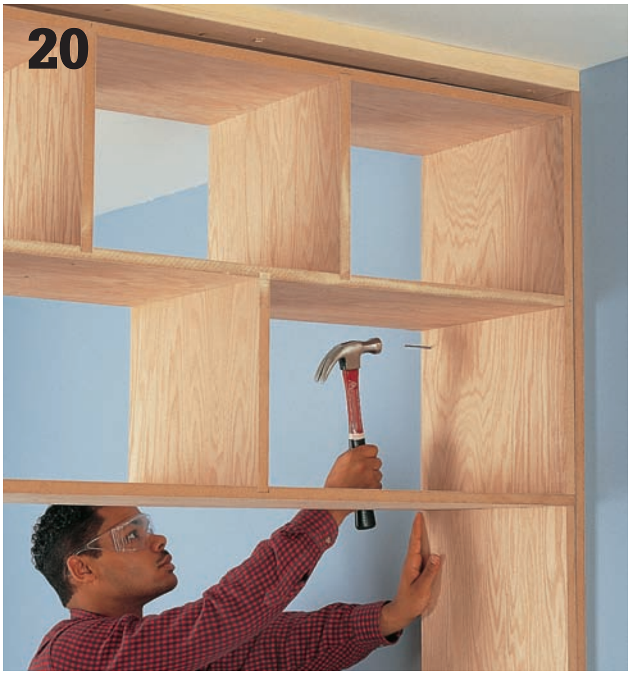
Measure and cut plywood shelf unit supports. Supports should be tall enough to leave a gap of about 1" beneath the top plates when the shelf unit is mounted on their top edges. Attach the shelf unit supports to the inner and outer end panels, using glue and 1¼" finish nails.

19



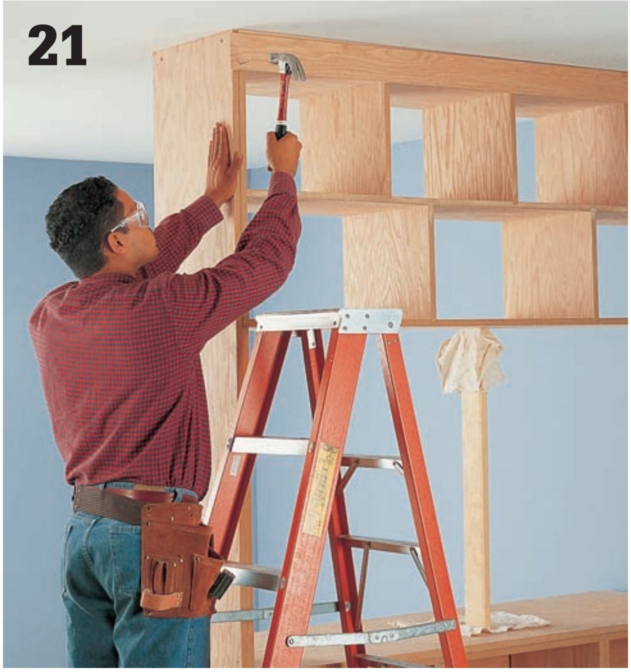
With a helper, lift the shelf unit onto the tops of the shelf unit supports. There should be a gap of about 1" between the shelf unit and the top plates.

20

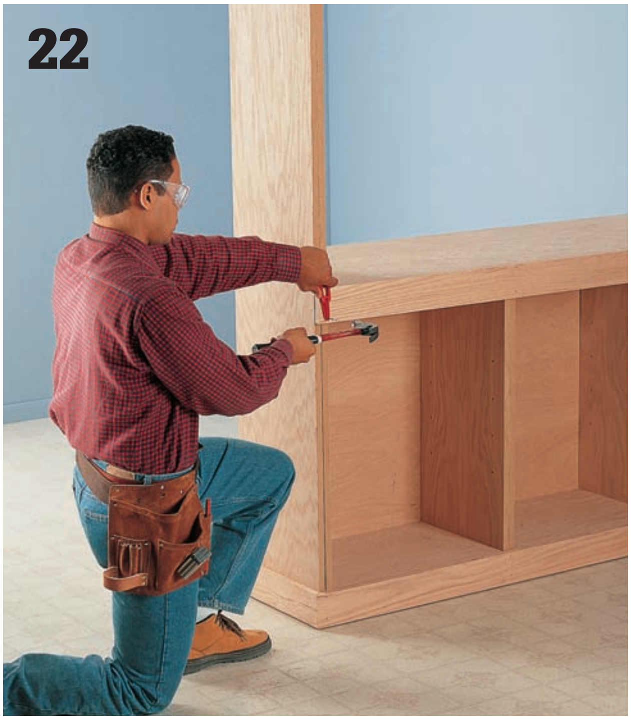


Align the edges of the upper shelf unit with the edges of the end panels. Attach the shelf unit by driving 1¼" finish nails through the side panels and into the end panels. Space nails 4" apart, along outer edges of shelf unit.

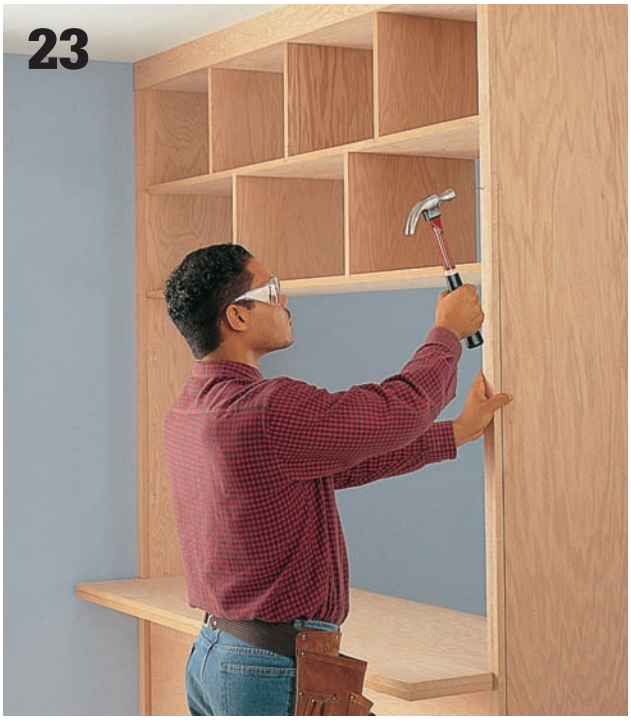
21



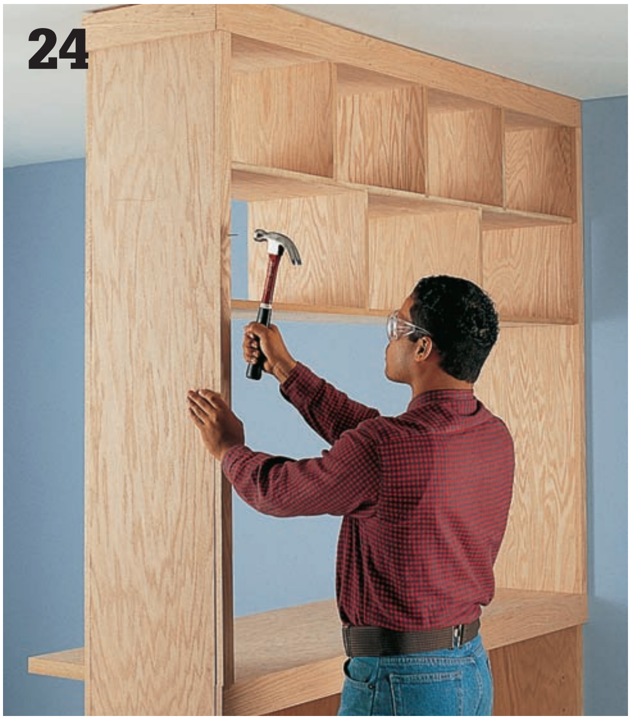
Set a 2 × 4 brace between the countertop and the shelf unit, then measure and cut 1 × 4 top and bottom rails for the face frames. Miter the corner joints at the edges of the outer end panel, and butt the trim against the wall at the inner end panel. Drill pilot holes, and attach rails with glue and 2" finish nails driven into panels and framing members.


22

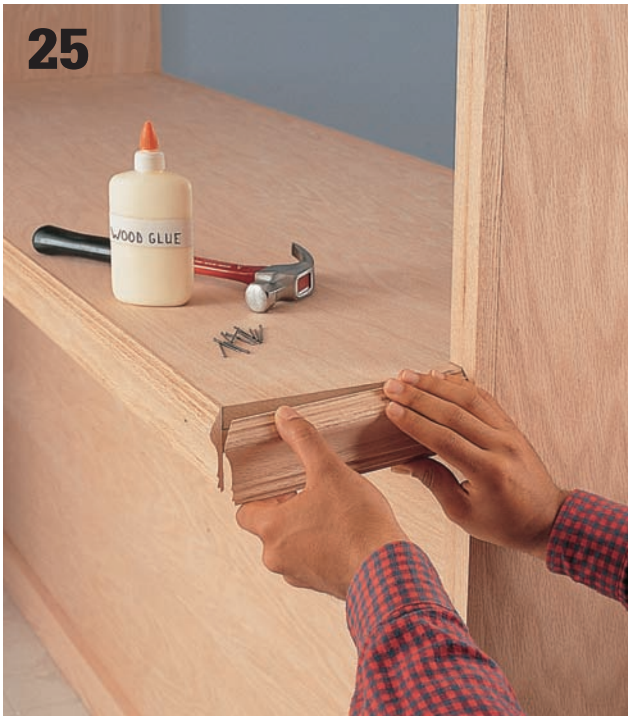
Measure and cut 1 × 4 countertop rail to reach from the wall to the outside edge of the outer end panel, on the front side of the room divider. Attach the rail to the edge of the countertop, using glue and 2" finish nails driven through pilot holes.


23

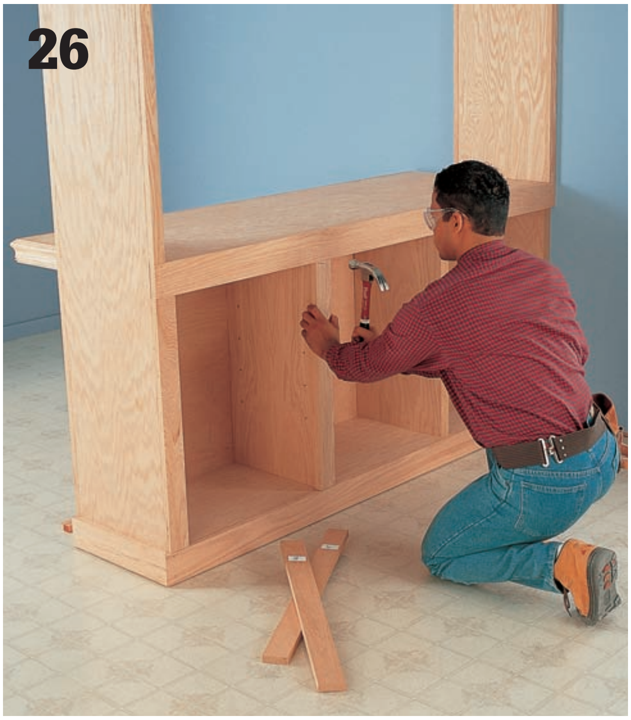
Measure and cut 1 × 2 face frame stiles to fit between the bottom rail and the top rail at the back of the room divider. Make a ¾" × 1½" notch in each stile, where the edge of the countertop will fit. Attach the stiles to the end panels, using glue and 2" finish nails driven through pilot holes.


24

Measure and cut 1 × 2 stiles to fit between the countertop rail and the top rail at the front of the room divider. Position stiles over the edges of the end panel, and attach with glue and 2" finish nails driven through pilot holes.

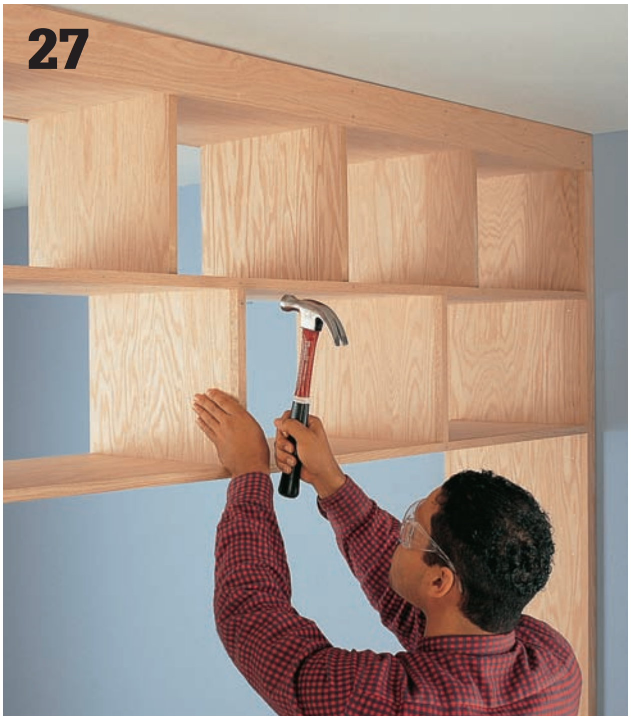

25

Cover the countertop overhang with ornamental trim molding mitered at a 45° angle at corner joints. Attach with glue and 1½" finish nails driven through pilot holes.



26

Measure and cut 1 × 3 stiles to fit between the bottom rail and the countertop rail on the back side of the room divider. Position end stiles flush with the outside faces of the end panels, and center the interior stiles over the riser assemblies. Attach with glue and 2" finish nails driven through pilot holes.

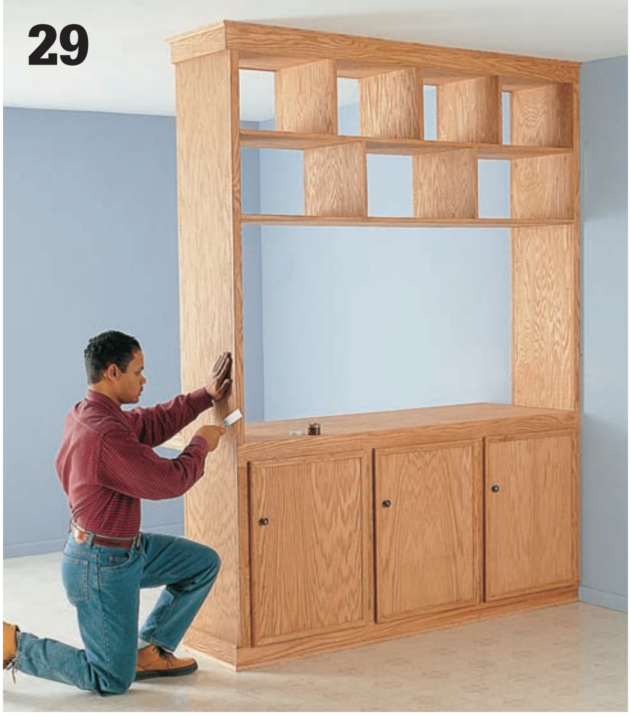


27

Attach ¾" shelf-edge strips to all exposed edges of the upper shelf unit, using glue and 1" finish nails driven through pilot holes. Cut horizontal strips the full length of the shelf unit, then add vertical strips between the horizontal strips.

28

Cut adjustable shelves for the cabinets, attach shelf-edge trim if desired, then install shelves, using pin-style shelf supports.



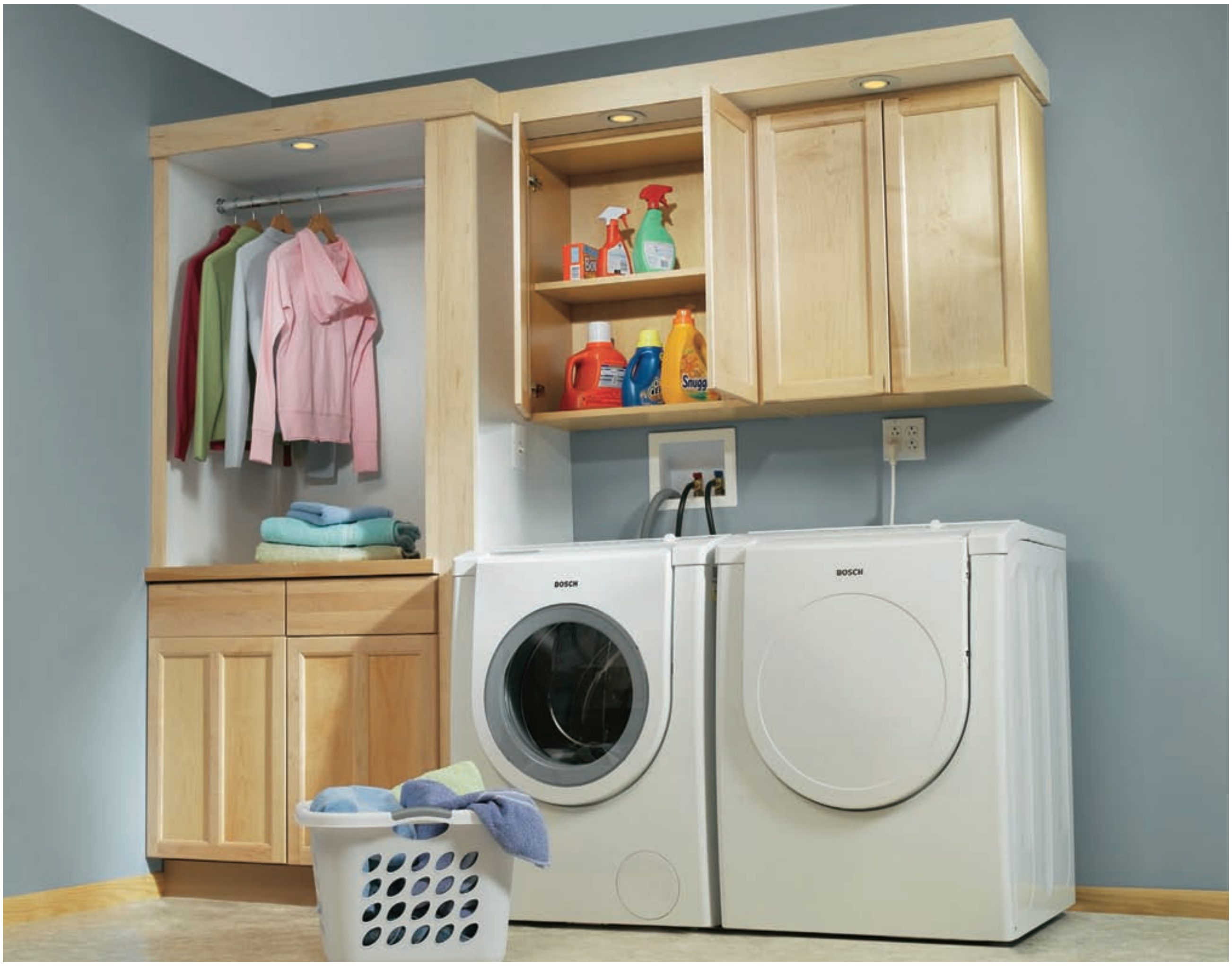
29

Cover gaps at ceiling with cove molding, and along floor and wall with base shoe molding. Fill holes, sand, then apply finish. Build, finish, and hang overlay cabinet doors (pages 46 to 47). Attach all remaining hardware.

Laundry Center

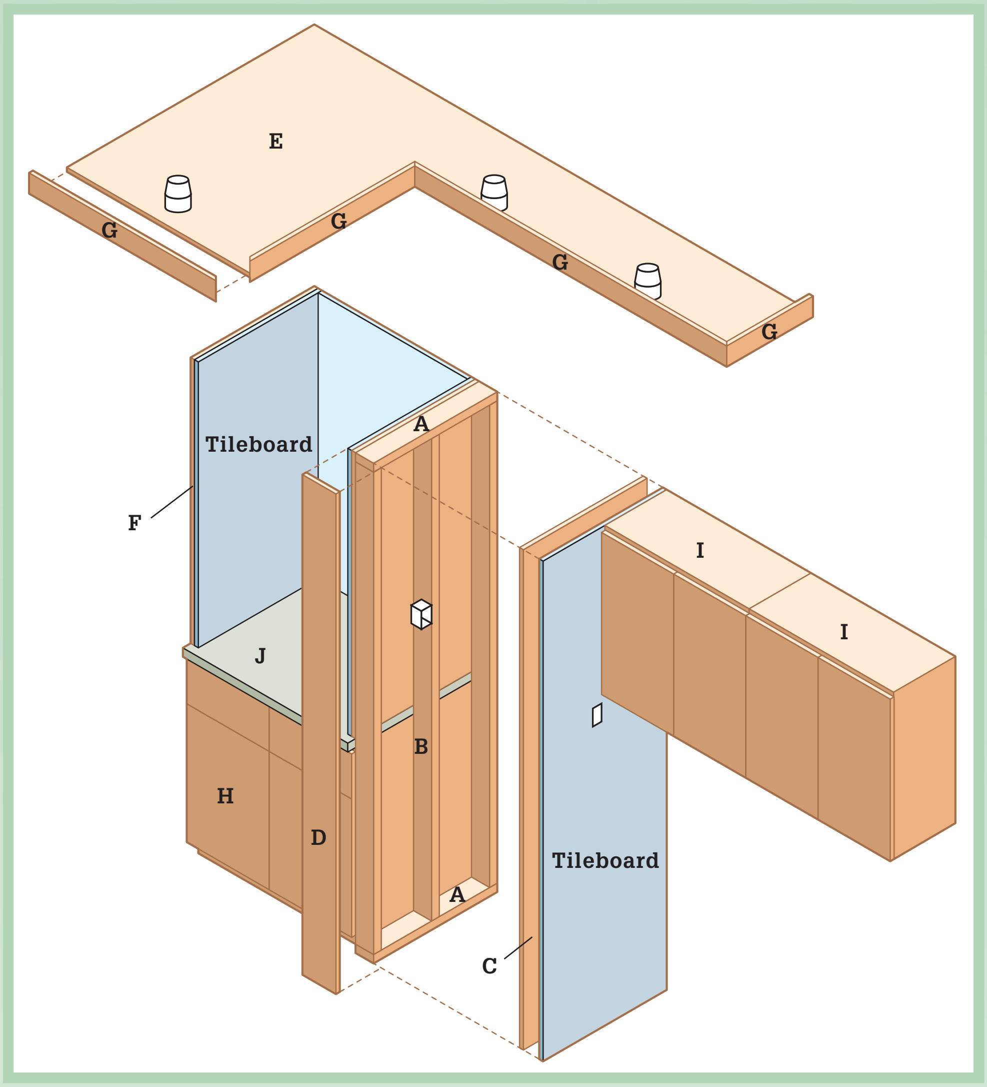
Many of the areas where we do our laundry lack two important features: organization and lighting. This laundry center is a self-contained built-in that functions like a room within a room, adding both storage space and task lighting for what can otherwise be a disagreeable task. It is built from a base cabinet and butcher block countertop on one side of a 24"-wide, 7 ft. tall stub wall, and a bank of wall cabinets on the other side of the wall. The cabinets are designed to fit above a washer and dryer combo. The structure includes a ceiling with light fixtures mounted over both sides, and a switch wired into the stub wall to control the lights. The walls are built from inexpensive wall sheathing and, along with the ceiling, are clad with easy to wash tileboard that adds brightness while contrasting with the maple wood of the cabinets. The edges of the center are trimmed with clear maple.

If you are creating your built-in laundry center in a room that did not previously house your washer and dryer, arrange for and have installed the hookups for both appliances before you build. If you are not experienced with plumbing and wiring, hire a plumber and electrician to run any new drain, supply, dryer vent or electrical service lines. Also make sure to identify potential sources for electrical service to power the lights (in the version seen here, we installed recessed canister lights over the countertop and above the washer and dryer).



Tools

Tape Measure
Level
Pencil
Square
Drill/driver & bits
Powder-actuated nailer
Hammer or pneumatic nailer
Jig saw



Materials

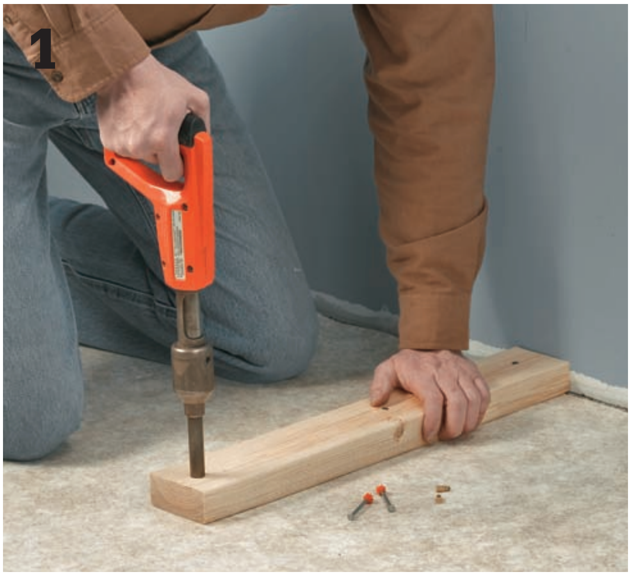
(2) 4 × 8 sheets wall sheathing (7⁄16 OK, 23⁄32 better)
(3) 4 × 8 sheets tileboard with an 8-ft. inside corner strip and panel adhesive
(2) Recessed canister light with trim kit
(1) Undercabinet fluorescent fixture (direct wire) –24"
(1) Clothes rod (24") with mounting hardware
1 × 2, 1 × 4 and 1 × 6 maple for trim
32" wide base cabinet
Butcher block countertop for base cabinet
(2) 28" 2-door uppers
Electrical box, switch, 14/2 romex, switch plate
End panel for upper cabinets
Panel adhesive
Drywall or deck screws
Nails
(4) 1½ × 3½ × 96 pine

Cutting List

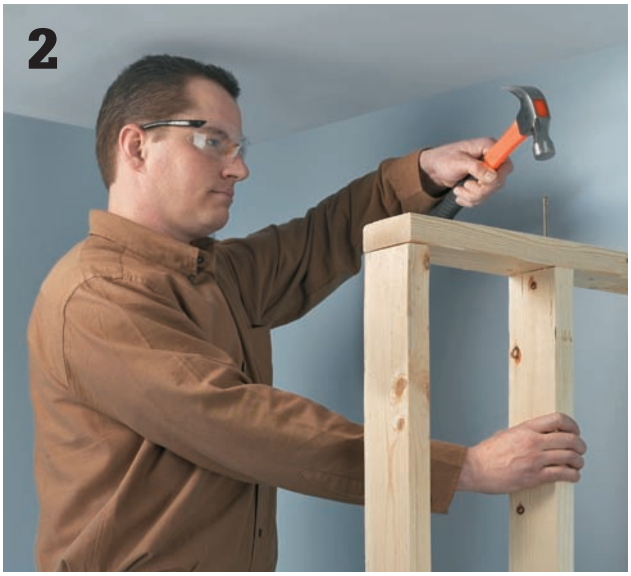
Part	No.	Desc.	Size	Material
A	2	Cap/sill plate	1½ × 3½ × 24"	2 × 4
B	3	Stud	1½ × 3½ × 79"	2 × 4
C	1	Full wall	⅝ × 24 × 82"	Sheathing
D	1	Wall cap	¾ × 5½ × 79"	Maple 1 × 6
E	1	Ceiling	⅝ × 24 × 100"*	Sheathing
F	2	Half wall	⅝ × 24 × 43"	Sheathing
G	4	Top trim	¾ × 5½ × cut to fit	Maple 1 × 6
H	1	Base cabinet	34½" h × 36" w	Stock cabinet
I	2	Wall cabinets	12 × 30 × 30"	Stock cabinets
J	1	Countertop	1½ × 25 × 36	Countertop

*Can be pieced together from two boards joined at the crotch of the L.

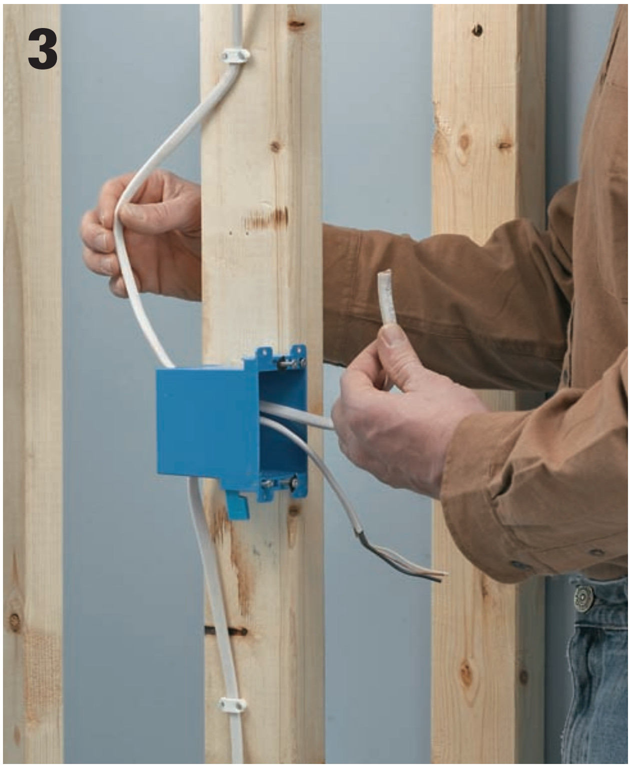
How to Build a Laundry Center



Attach the base plate for the stub wall perpendicular to the wall, allowing space between the stub wall and the corner for your base cabinet.



After toe-nailing the studs to the base plate (and facenailing the stud next to the wall if possible) attach the cap plate, making sure the studs are vertical.



Run cable and install boxes for the light fixtures. Hire an electrician to do this if you are not experienced with home wiring. (Note that you will need to apply for a permit and have your wiring inspected.)

FRAME THE STUB WALL

This built-in laundry center is anchored by a 7-foot-tall, 24"-wide stub wall, so start by framing the wall. Measure out from the corner the width of your base cabinet (36" here) and draw a 24"-long reference line perpendicular to the wall. Cut a 2 × 4 wall plate to 24" and attach it to the floor. If you are building in a basement with a concrete floor, use pressure-treated lumber for the base plate and attach it by driving concrete nails with a powder-actuated nailer (photo 1).

Cut three 2 × 4s to 79" long and attach them to the base plate by toe-nailing (reinforce connections with L-brackets if you wish). Then, cut a 24"-long cap plate and nail it to the free ends of the studs with 16d common nails (photo 2). If you are installing overhead lighting, run cable from the power source (don't hook up the wires yet) through the studs and to an electrical switch box mounted to the wall frame (photo 3). Also run sheathed cable from the electrical box and out through a hole in the wall cap plate. Run enough cable to reach the light fixtures. We wired the fixtures in series: the power lead goes to the electrical box for the undercabinet light first, and then runs from the box to the canister light. If you prefer to switch the light independently, install a double gang box and cable for two switched circuits.

INSTALL THE BASE CABINET

We designed this laundry center with matching base and upper cabinets. Install the base cabinet between the stub wall and the corner (photo 4—see pages 58 to 59 for information on installing base cabinets). You can use just about any type of countertop material you wish. We selected maple butcher block because it can resist water and heat, requires very little maintenance, and makes a nice surface for folding laundry. Plus, it matches the maple cabinets and trim boards. To secure butcher block, you need to drill extra-large guide holes through the nailing strips on the base cabinet and attach the countertop with a short screws and washers (photo 5). This allows the material to move as it expands and contracts, which butcher block will do.

INSTALL THE WALLS

At the very least, you'll need to cover both sides of the stub wall for your laundry center. If the walls in your installation area are fit for covering with tileboard, you won't need to create any additional wall surfaces. In part to create an attachment surface for the clothes rod, we also installed a wall surface on the left side of the project area. The wall surfaces are created by attaching sheathing to the wall studs and then bonding water-resistant tileboard over the faces of the sheathing with panel adhesive. Cut a piece of wall sheathing that's the same width as the stub wall and reaches the same height when placed on the countertop surface. Attach the sheathing to the side of the countertop

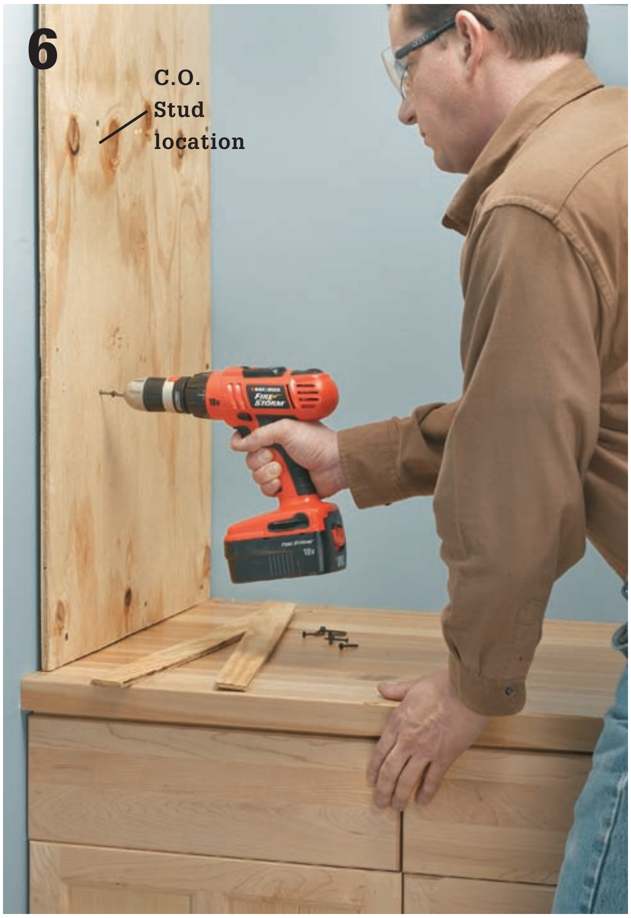
4

Install the base cabinet between the stub wall and the corner, making sure it is level and securely attached to at least one wall.

5

Attach the countertop material (butcher block is seen here). The countertop should be flush against both walls and it should overhang the base cabinet slightly.

6



Attach wall sheathing to the wall to create a nailing surface at the wall end of the countertop area.

7

Clad the stub wall on both sides with wall sheathing, making sure to cut out accurately for the switch box.

area (photo 6). Insert a couple of furring strips between the sheathing and the wall to create airspace.

Clad the stub wall on both sides with wall sheathing (photo 7). Make a cutout for the switch box. The sheathing on the countertop side should rest on the countertop. Slip a couple of shims underneath the wall sheathing on the washer and dryer side so the sheathing does not contact the floor, which can lead to wicking of water.

Cut pieces of tileboard to fit the wall surfaces and attach them with panel adhesive. Attach inside corner strips cut to fit at the inside corners of the countertop area (photo 8). Rub the tileboard surfaces aggressively with balled-up towels to help seat the tileboard into the adhesive.

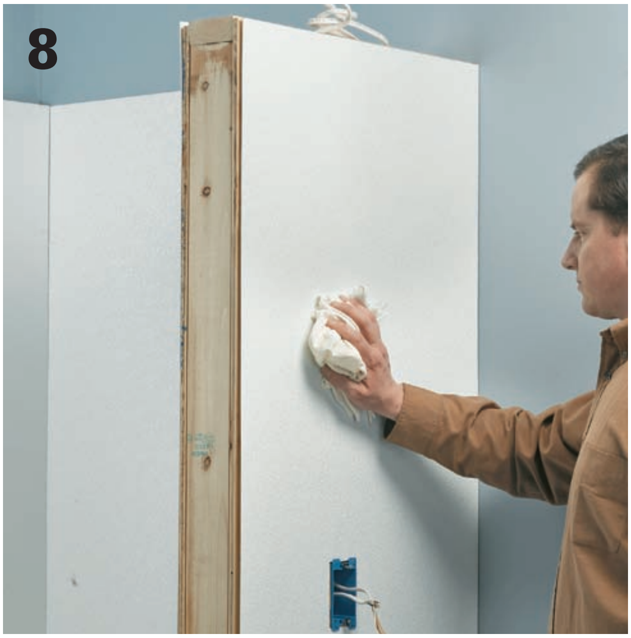
HANG THE UPPER CABINETS

The upper cabinets should be mounted on the walls so their tops are flush with the top of the stub wall and they butt up against the stub wall at the side. Attach with a ledger system or by driving cabinet screws through the mounting strips and into the wall at stud locations (photo 9). See pages 54 to 59 for more information on hanging wall cabinets. If the exposed cabinet end is not finished, purchase and install an end panel to match the cabinet type (or, make one from ¼" plywood).

MAKE & INSTALL THE CEILING

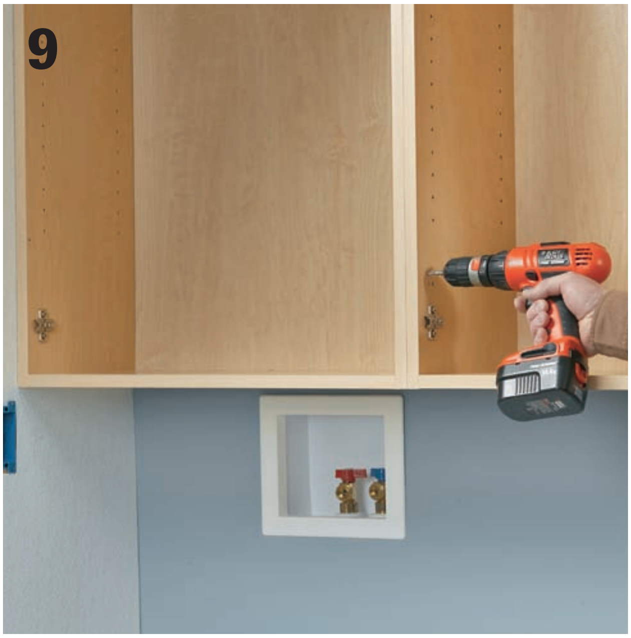
You'll find that it's easiest to cut the ceiling board, attach the tileboard and mount the light fixtures all before you attach the ceiling assembly to the stub wall and cabinets. Start by cutting the ceiling board to size and shape from a piece of 4 × 8 sheathing (photo 10). We designed the ceiling to be 24" wide above the cabinet, then to cut back to 18" wide over the wall cabinets, which creates a 6" overhang above the cabinets so an undercabinet light fixture can be mounted if you wish. As shown, the side-to-side width of the structure is over 96", so a single piece of 4 × 8 ft. wall sheathing won't cover it. You'll need to make the ceiling in two pieces, so size the pieces so the seam falls in the middle of the top plate for the stub wall.

8



Cover the wall surfaces with tileboard, which is attached with panel adhesive and set by rubbing with a rag.

9

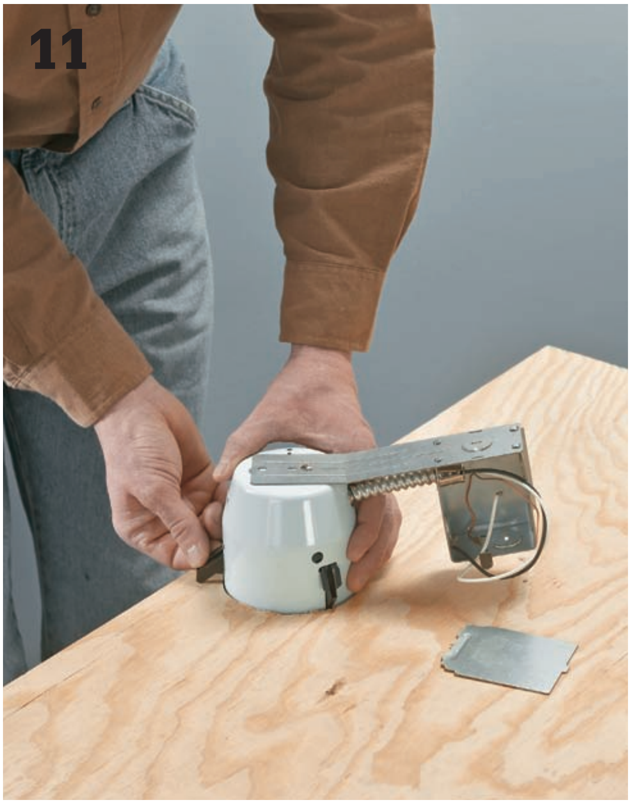


Install the wall cabinets so they are level and their tops are flush with the top of the stub wall.

10

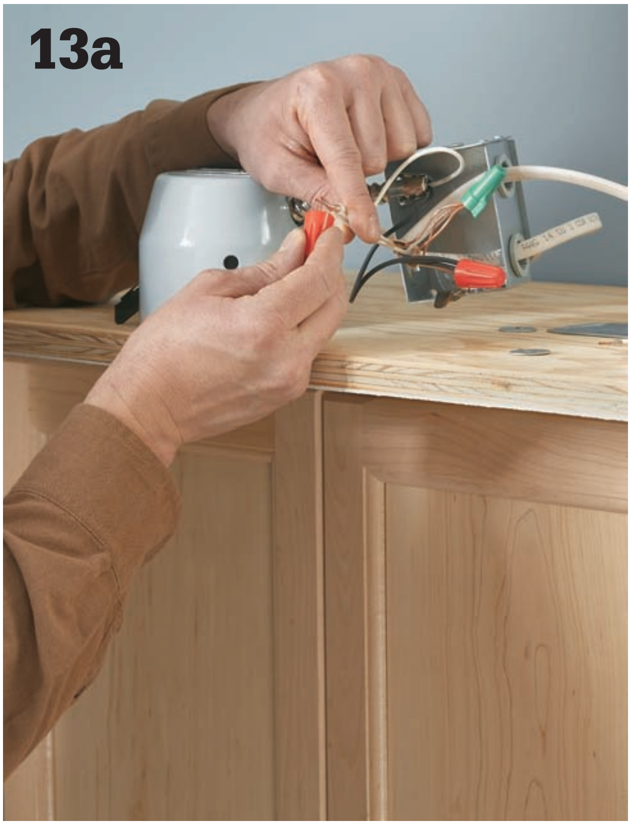
BLACK&DECKER

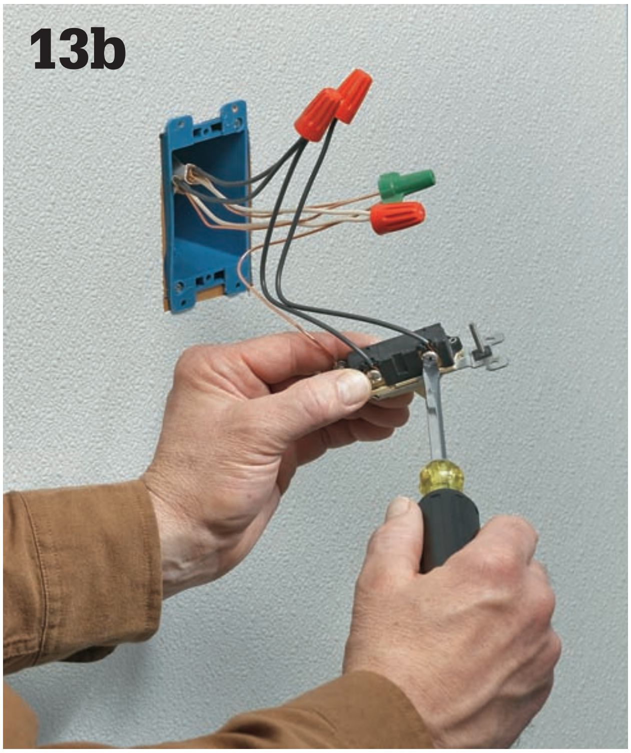
Cut the ceiling to size and shape from a piece of sheathing (you'll need multiple pieces if your project is more than 8 ft. long).



Mount the hardware and box for the light fixture to the ceiling panel before you install the ceiling.

Attach the ceiling panel to the laundry center wall and the cabinets.





Make the wiring connections at the light fixtures (left) and at the switch (right).

Attach tileboard to the ceiling panel on the face that will be facing downward. Then, plot out the locations for the light fixtures and mount the housings and ceiling boxes to the back of the ceiling panel as needed (photo 11). Set the ceiling panel over the laundry center and attach it with nails or screws driven into the top plate of the stub wall and the cabinet sides (photo 12).

HOOK UP LIGHTS & INSTALL TRIM

Make the wiring connections at the light fixtures and at the switch (photos 13a and 13b). You will need to have a wiring inspection before making the final hookup at the power source.

Cut pieces of 1 × 6" maple to make the top trim. Miter the outside and inside corners as you install the trim. Use a pneumatic nailer to attach the trim if you have access to one (photo 14). Attach the vertical trim members to cover the wall at the left side of the project and the end of the stub wall (photo 15). Scribe as necessary (see page 66) and rip the stub wall trim to fit. For a more finished look, round over the edges of the vertical trim pieces slightly.

Finally, slide in, level and hook up your washer and dryer (photo 16). Make sure to follow local codes for water and drain supply and for venting your dryer.

14

Trim out the top of the structure with 1 × 4 hardwood to conceal the gap beneath the ceiling panel. If you prefer, you can use crown molding here.

15

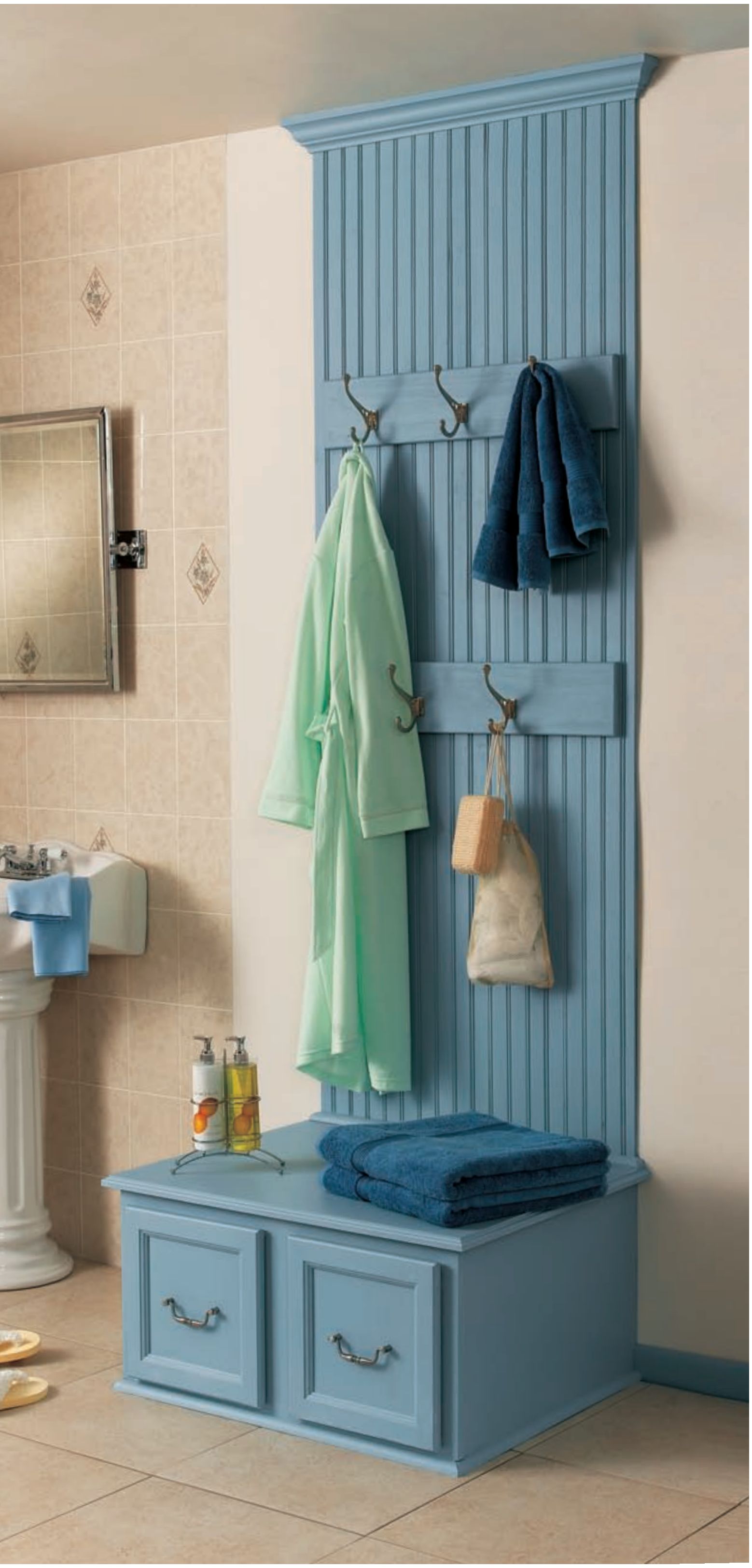
Attach the vertical trim boards, butting them up against the top trim and keeping the bottom slightly above the floor. Apply a finish and top coat to the trim boards as desired.

16

BOSCH
BOSCH

Install your washer and dryer (or have your appliance dealer install them for you).

Towel Tower



If there's one place in the house that collects everybody's stuff, it's the bathroom. Towels, clothes, cleaning supplies, even laundry. But some fancy design work using a couple of refrigerator wall cabinets and some cool carpentry create a niche spot that can provide a central location for all kinds of different items. Suitable even for small bathrooms, this towel tower also adds texture and color to the space. And another added benefit to this project is the seating provided by the countertop top on the cabinet.

The beadboard backing for this project is made with painted $\frac{3}{8}$"-thick tongue and groove pine, sometimes called carsiding. More advanced carpenters may prefer to make their own custom beadboard from hardwood and give it a custom wood finish.

The base for this project is an over-the-fridge size wall cabinet (sometimes called a bridge cabinet). At 15" high, it is within the range of comfortable seating heights. But if you prefer a slightly higher seat (and many people do), build a 2 × 4 curb for the cabinet to rest on (see the Window Seat project on pages 80 to 87 for information on how to install a seat in a 2 × 4 curb).

To conceal the seam where the towel tower meets the floor, we trimmed around the base with base shoe trim, mitering the corners. We used the same trim stock to conceal the gap where the seatboard meets the tongue-and-groove paneling. Here, however, we added small miter returns to the ends of the base shoe (see pages 42 to 43).

Materials

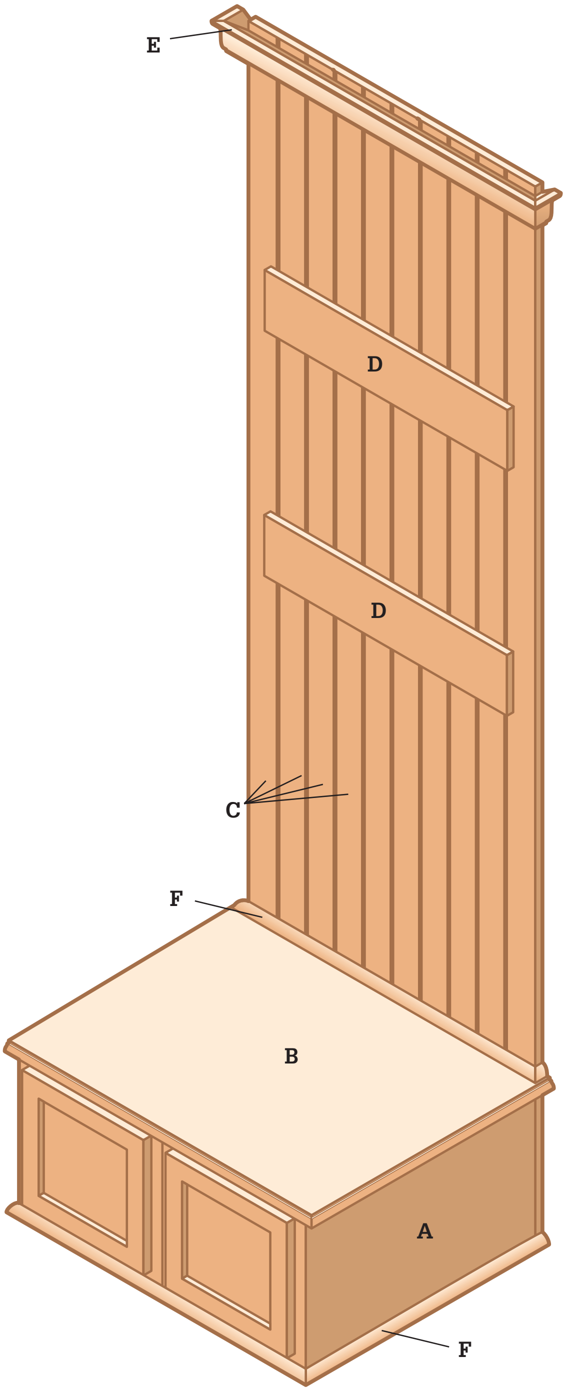
32 sq. ft. tongue-and-groove paneling
(2) 1 × 6 × 8 ft. pine
3 ft. crown molding
½ sheet ¾"-thick MDF
12 ft. quarter-round molding
Towel hooks
Fasteners

Cutting List

Key	No.	Description	Size	Material
A	1	Over-fridge cabinet	15h × 30w × 24d	
B	1	Seatboard	¾ × 25 × 32*	MDF
C	8	T&G paneling	⅜ × 5½ × 71½"**	Pine
D	2	Towel hook backers	¾ × 5½ × 27"	Pine 1 × 6
E	3 lin. ft.	Crown molding	Cut to fit (w/miters)	Pine
F	12 lin. ft.	¼-round molding	Cut to fit	Pine

* Finished size: requires slightly larger board for machining

** Length equals distance from top of seatboard to ceiling minus ½"



How to Build a Towel Tower

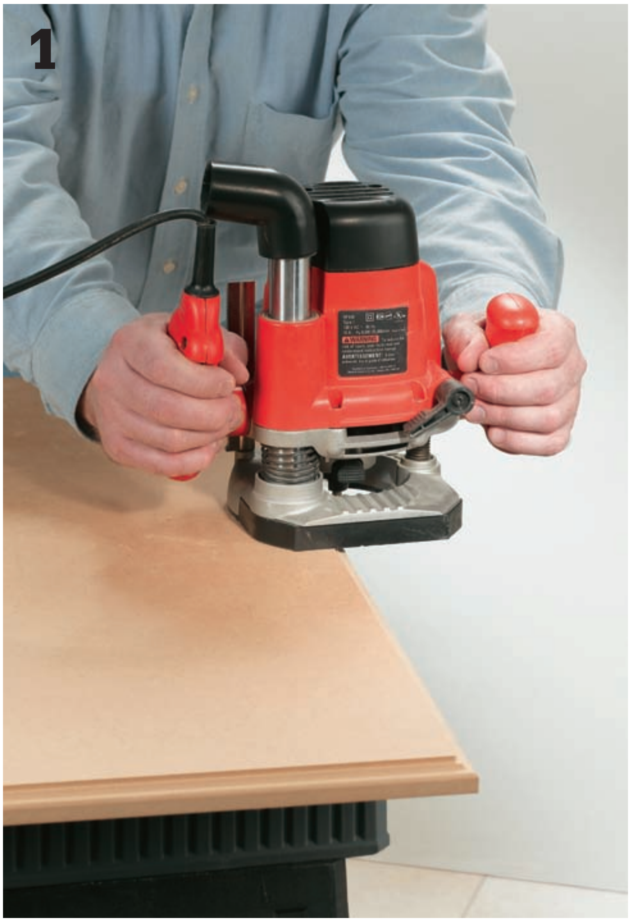
INSTALL THE BASE CABINETS

Begin by making the seatboard that tops the refrigerator cabinet. Cut a piece of medium density fiberboard (MDF) so it is 1" wider than the cabinet and a couple of inches longer front-to-back (make it about 26" if using a 24" cabinet as shown here). Mount a piloted ogee or roundover bit (or other profiling bit of your choice) into your router and shape the front and side edges (photo 1). You'll probably get a little bit of blow-out at the back edge, which is why it's recommended that you make the workpiece a couple of inches too long. Once you've routed the profiles, trim the back edge so the front overhangs the cabinet by 1". Coat all faces and edges with primer and at least two coats of paint.

Attach the seatboard with screws driven through the mounting strips on the cabinet top and into the underside of the seatboard. The back edge of the seatboard should be flush with the back edge of the cabinet and the overhang should be equal on the sides. Since this cabinet is small, it might be best to clamp the blank in location on the cabinet, then turn the cabinet on its back so you can access the fastener locations more easily (photo 2).

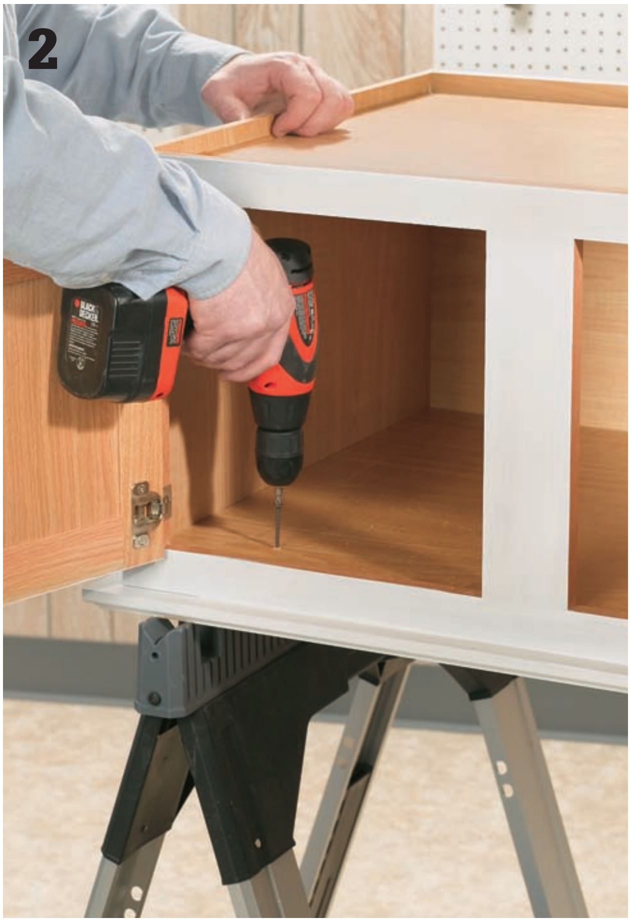
Install the cabinet in the project location. Baseboard and any other obstructions should be removed from the project area. Slip shims below and behind the cabinet as needed to make sure it is level and plumb. Attach the cabinet to the wall by driving 2" wallboard screws through the cabinet back at wall stud locations (photo 3).

1



Rout a profile, such as an ogee or roundover, into the sides and front of the seatboard. Use a router table if you have one, otherwise hand-machine it with a piloted profiling bit.

2



Because these cabinets are so small, it's easier to pre-gang them together, then flip the assembly upside down to install the seatboard.

3

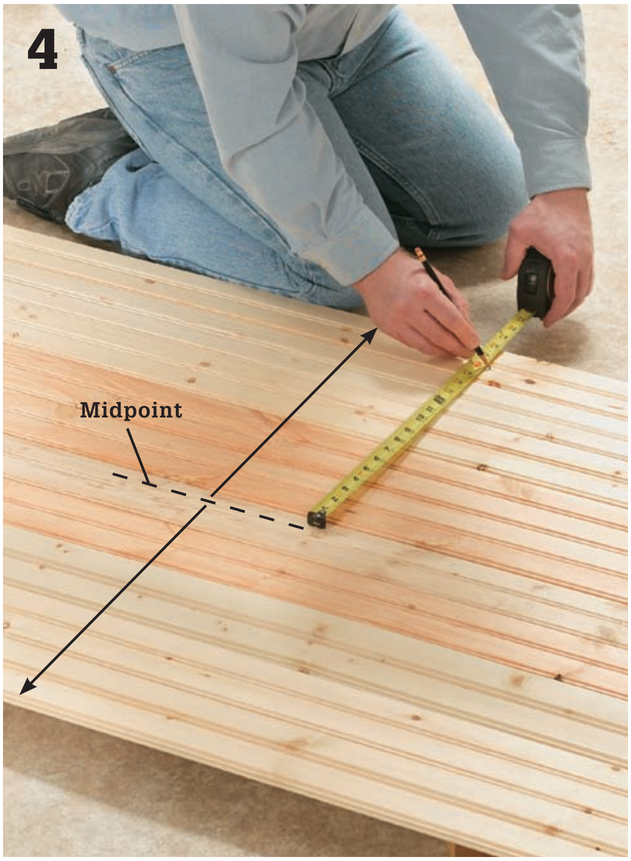
Drive screws through the back of the cabinet at the marked wall stud locations.

INSTALL THE PANELING

The backer board for the towel tower can be made from a number of building materials, while retaining the beadboard appearance that lends a bit of country style to this project. The easiest and cheapest product you can use is beadboard paneling: thin sheet stock that comes in 4 × 8 ft. panels. You'll find a wide range of colors, patterns and qualities in the beadboard sheet stock, including some that is pre-sized to around 42" for installation as wainscoting. The cheapest material has a printed pattern layer laminated over hardboard. The better quality material has hardwood veneer over a plywood or lauan backing. We chose real tongue-and-groove boards made from pine. With actual dimensions of ⅜ × 5½", the carsiding product we used has enough depth to create a convincing profile but is still relatively inexpensive.

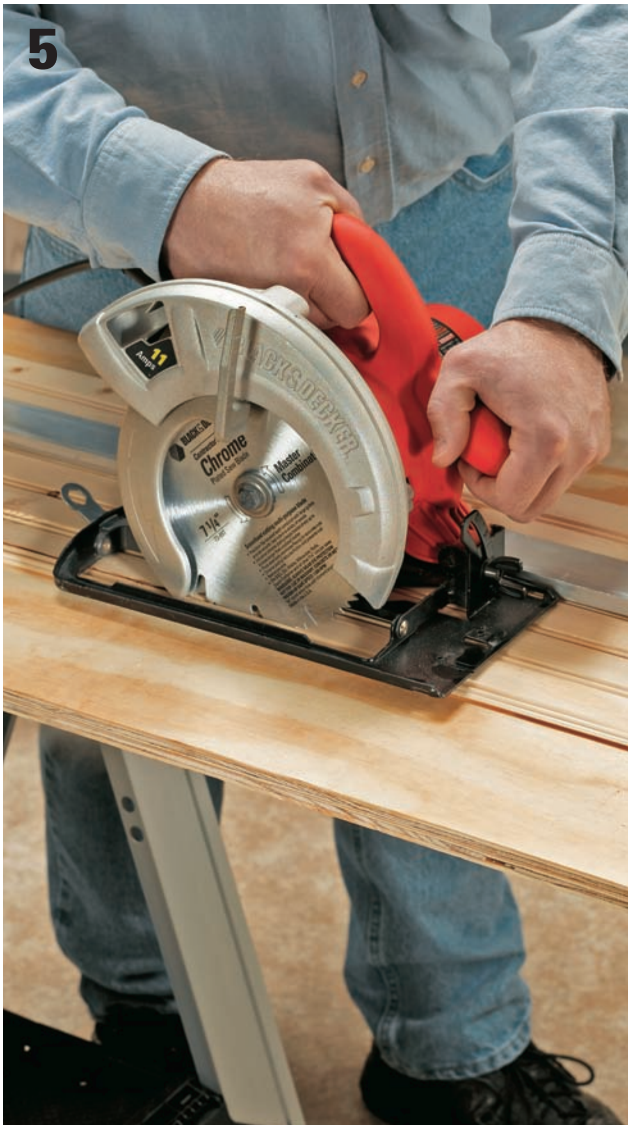
Because it is very unlikely that the strips of carsiding will be exactly the same width as your base cabinet once they're installed, you'll need to rip-cut the outside boards to fit the project area (it is better to rip-cut both outer boards an equal amount than to take everything out of one of the boards). To gauge where to make your cuts, assemble enough boards to cover the width of the cabinet and lay them out on a flat surface (photo 4). Mark the centerpoint of the middle board and measure out half the distance in each direction. Make rip-cut lines at these points.

4



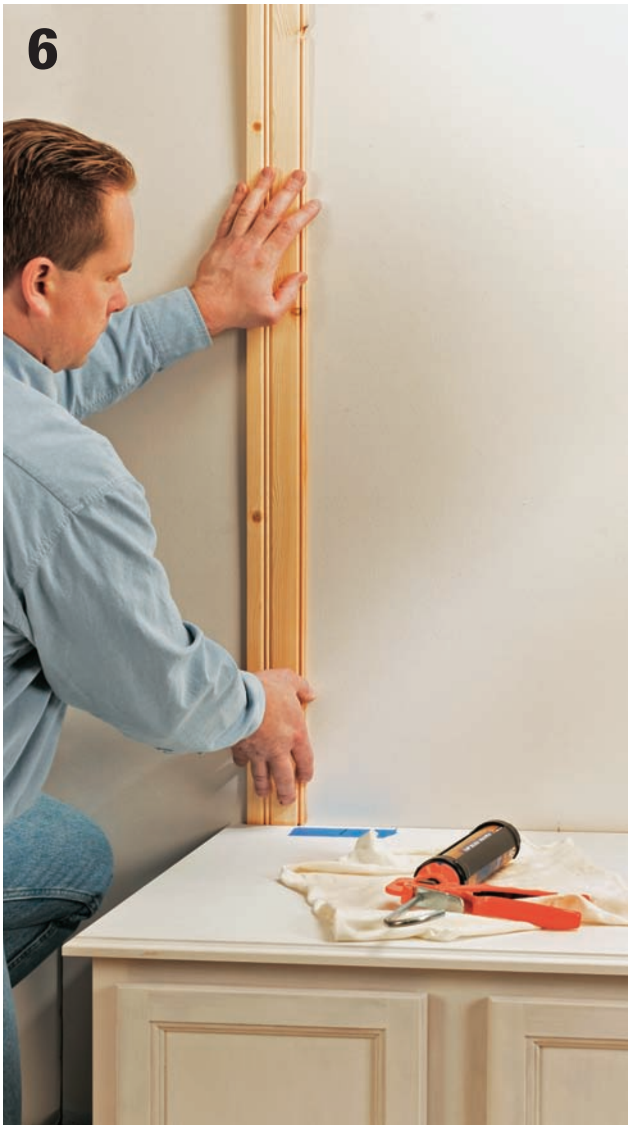
Lay out the tongue-and-groove carsiding boards in a row, with the tongues fitted into grooves. Measure out in one direction (half the width of base cabinets) from a midpoint line in the center board.

5



Clamp a straightedge over a tongue-and-groove board, placing a piece of scrap plywood underneath as a backer. Rip-cut the board to the correct thickness for the filler piece.

6



Press the trimmed filler board to the wall, seating it in construction adhesive, at the left edge of the panel area.

Before ripping the boards, trim all of your carsiding stock so it is ¼" to ½" shorter than the distance from the seatboard to the ceiling. Then, trim the outer carsiding boards to width using a table saw (make sure you are trimming off the correct edge, be it tongue or groove). If you have access to a tablesaw, use it to make the cuts. Otherwise, use a circular saw and a straightedge cutting guide. With thin stock like this, cutting a scrap wood backer board along with the workpiece will result in a cleaner cut. Make the rip cuts (photo 5) and sand the edges if necessary to smooth out the cuts.

Use a 4-ft. level to extend plumb lines directly up the wall from the outside edges of the seatboard. Then, mark the wall stud locations on the seatboard and ceiling with tape. Begin installing the carsiding on the left side, with the left trimmed board. In most cases, the tongue will be preserved on this board and should be oriented inward (photo 6). Apply a heavy bead of construction adhesive to the back of the board and stick it to the wall. If it happens to fall over a wall stud, nail it in place by driving a finish nail (or, preferably, a pneumatic brad) through the tongue at an angle. The nails should be countersunk enough that they do not obstruct the groove of the adjoining board.

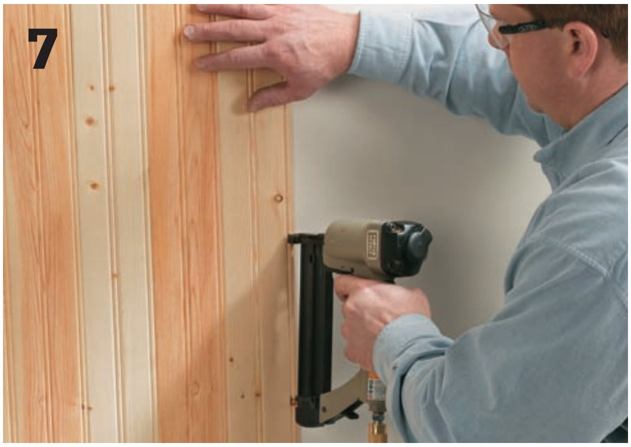
Continue installing boards until you reach the right edge (photo 7). Use plenty of adhesive and drive several nails when you hit a wall stud. If none of the wall studs align beneath carsiding joints, tack the board that falls over a wall stud by face-nailing once at the top and once at the bottom. In most cases, you should be able to tack each board at the top too, nailing through the face and into the stud wall cap plate (this will be concealed by crown molding anyway). *Note: The mounting boards for the towel hooks will help hold the carsiding in place once they are attached at stud locations.*

Cut the towel hook backer boards to length from 1 × 6 stock. For a more decorative effect, cut a chamfer profile into the edges (or just the top and bottom edges) with a router and chamfering bit. Install the backer board by driving 2½" deck screws, countersunk, at wall stud locations. Fill the screw holes with wood putty.

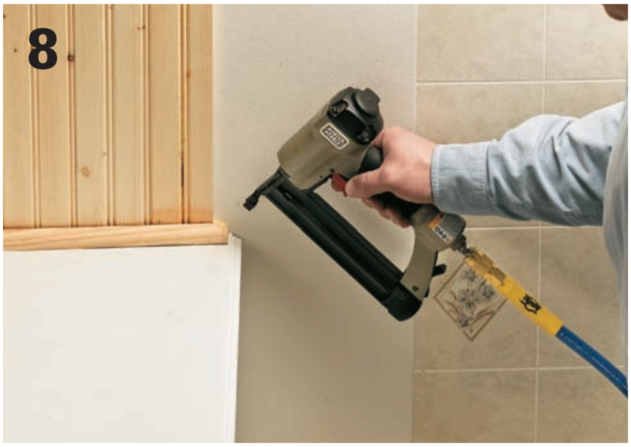
Install quarter-round molding around the bottom of the cabinet to conceal the gap where it meets the floor. Also install quarter-round to conceal the gap where the carsiding meets the cabinet seatboard (photo 8). Make mitered returns at the end for a more finished appearance (see pages 42 to 43).

Attach crown molding to the top of the project (photo 9), also making a mitered return to finish the ends of the molding (see pages 42 to 43).

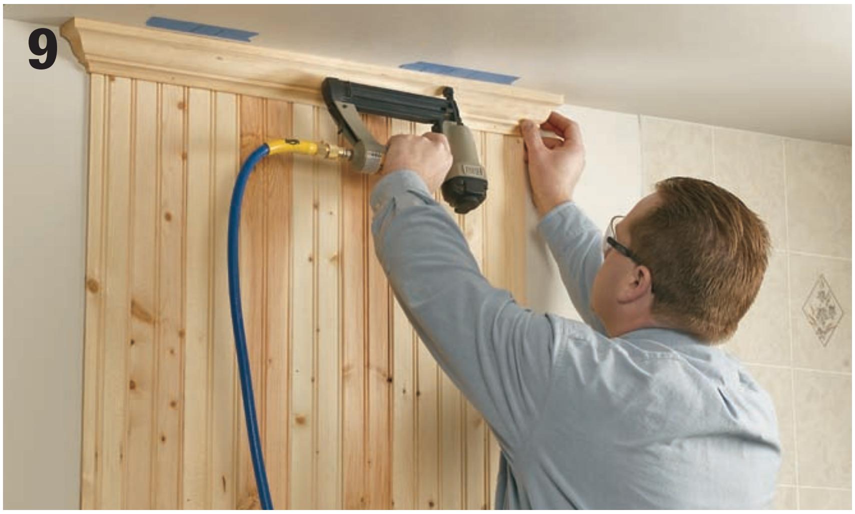
Sand all wood surfaces and fill nail holes, screw holes and visible gaps with wood putty. Paint the project with primer and at least two coats of enamel paint. Finally, attach the towel hooks to the towel hook backers.



Drive a pneumatic brad through the tongue of one of the far-right boards, and into a marked wall stud.



Install quarter-round or base shoe molding at the top edge of the seatboard where it meets the carsiding. Tie the molding back to the wall with mitered returns (see pages 42 to 43).



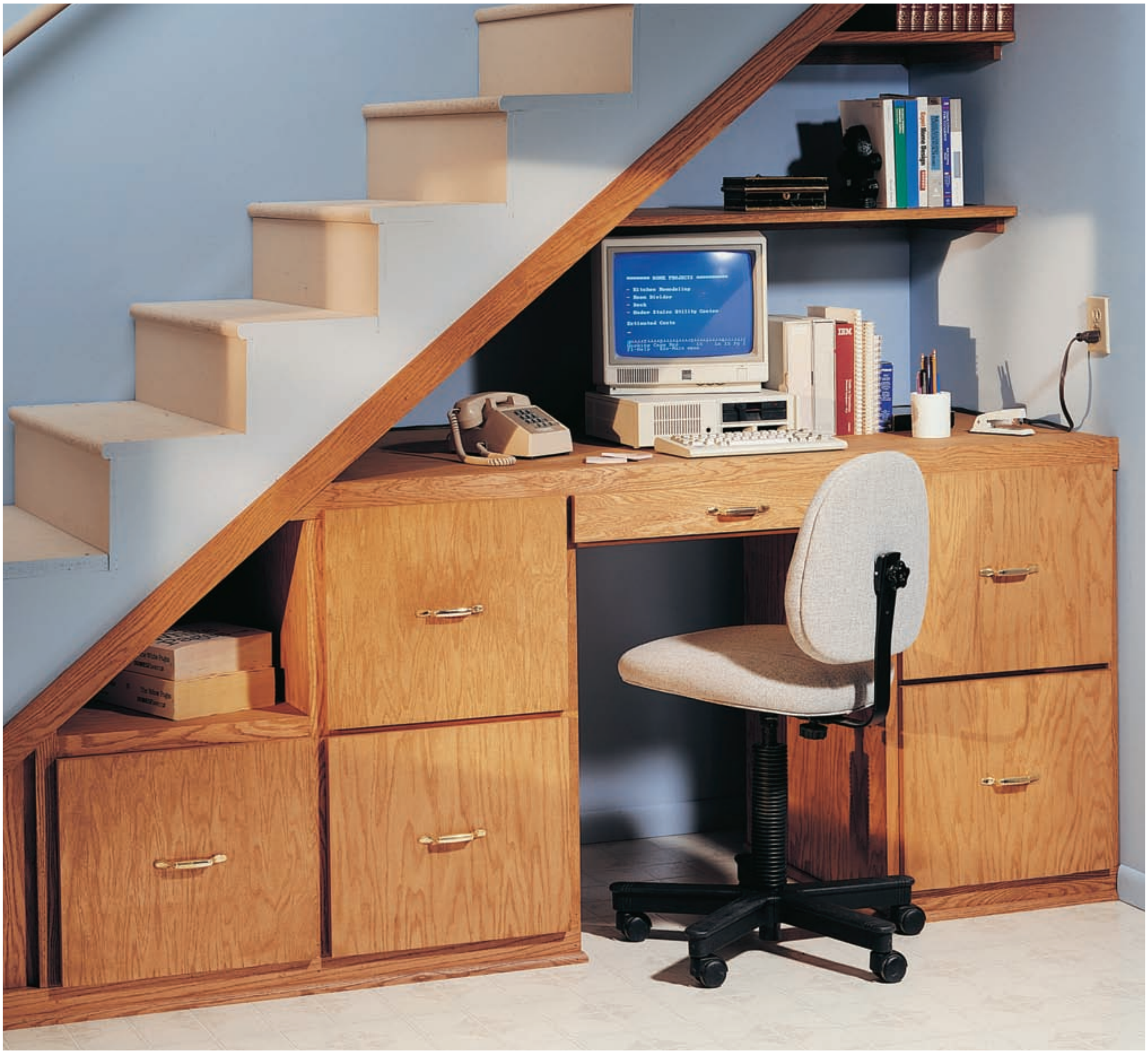
Attach crown molding at the top of the project, creating mitered returns at the ends. Mark the ceiling joists with tape.

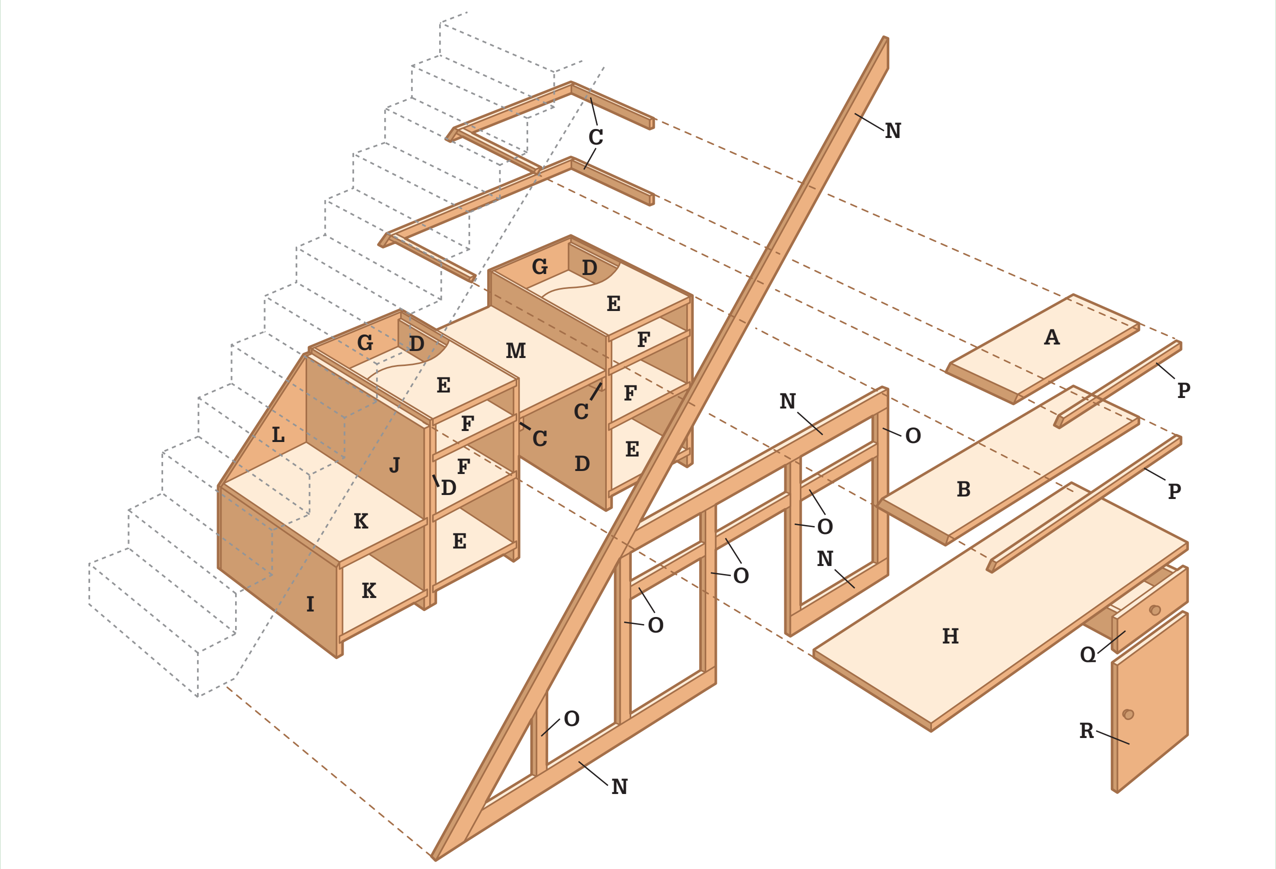
Understairs Work Center

The irregular space beneath a staircase can be used for a variety of creative built-in projects. Because the dimensions and angles of understairs areas vary widely, finding stock cabinetry that fits the space is difficult. However, the design shown here can be built to fit almost any area.

The understairs work center, in its simplest form, is a pair of basic cabinets that support a countertop. The basic cabinets are built to a standard height, depending on their use. You can adapt the size of the understairs work center by shortening or lengthening the countertop and connecting shelf. A small cabinet and upper shelves are added to fill out the remaining space. The depth of the countertop also can be adjusted to match the width of your staircase.

Most understairs projects require that you make many angled cuts, but in the project shown here, you will need to make only a few miters and bevels. Beveled cuts can be made with a power miter saw, circular saw, or table saw.





Tools

Pencil
Tape measure
Level
T-bevel
Circular saw
or table saw

Cordless Drill/driver
Drill bits
Hammer
Router with ¾" straight
bit and ⅜" rabbet bit
Bar clamps
Power miter saw

Materials

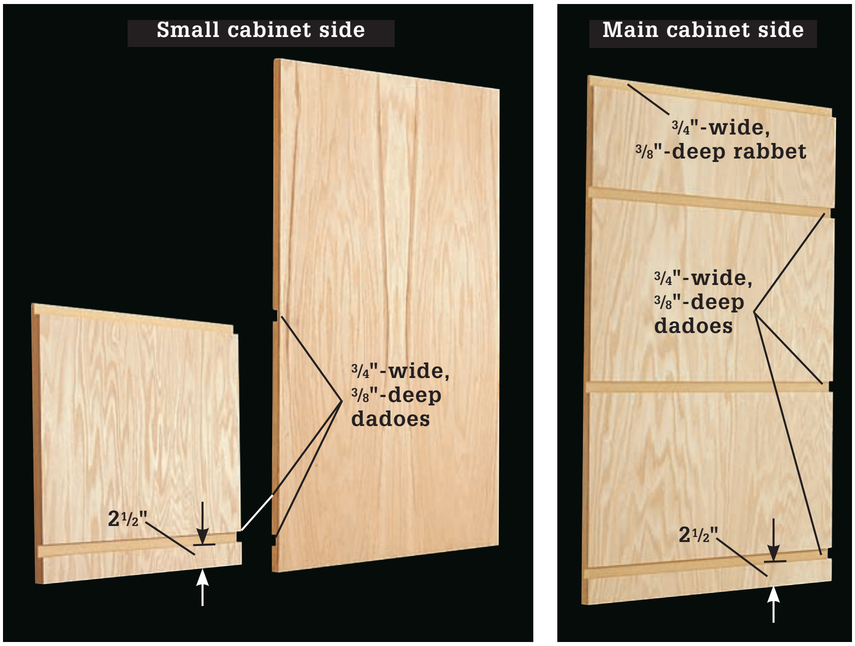
Shims
Finish nails (1", 1¼", 2")
Utility screws (1", 1¼", 2½")
1" wire nails
Trim molding
Finish materials
Door and drawer hardware

26 lineal ft. oak 1 × 3
25 lineal ft. oak 1 × 2
1) ¼ × 4 ft. × 8 ft. plywood
3) ¾ × 4 ft. × 8 ft. oak plywood

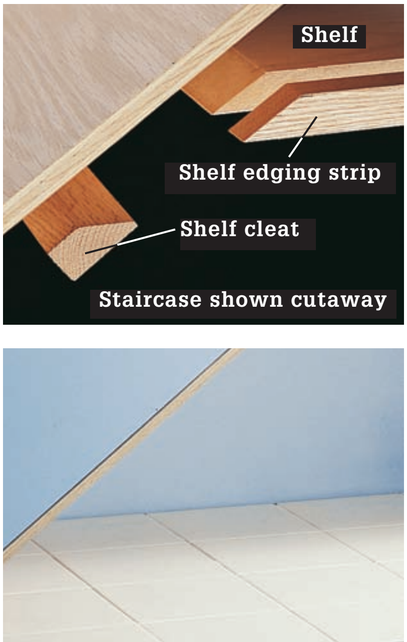
Cutting List

Part	No.	Desc.	Size	Material
A	1	Top shelf	28 × 18"	¾" plywood
B	1	Lower shelf	42 × 18"	¾" plywood
C		Shelf cleats	12 lineal ft.	1 × 2
D	4	Cabinet sides	35½ × 24"	¾" plywood
E	4	Cabinet base, top panels	19¼ × 24"	¾" plywood
F	4	Cabinet shelves	19¼ × 24"	¾" plywood
G	2	Cabinet backs	20 × 35"	¼" plywood
H	1	Countertop	32 × 64"	¾" plywood
I	1	Small cabinet side	18 × 24"	¾" plywood
J	1	Small cabinet side	34½ × 24"	¾" plywood
K	2	Small cabinet bottom & top	19¼ × 24"	¾" plywood
L	1	Small cabinet back	20" × 34"	¼" plywood
M	1	Connecting shelf	27⅞ × 24"	¾" plywood
N		Face frame pieces	26 lineal ft.	1 × 3 oak
O		Face frame pieces	25 lineal ft.	1 × 2 oak
P		Shelf edge strips	4 lineal ft.	¾" plywood
Q		Drawers	see pages 48 to 49	
R		Cabinet doors	purchase to fit	

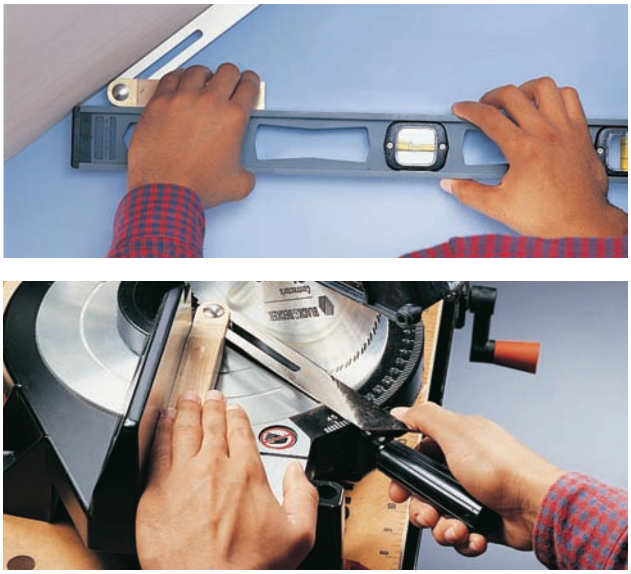
Project Details


Small cabinet side
¾"-wide, ⅜"-deep dadoes
2½"
Main cabinet side
¾"-wide, ⅜"-deep rabbet
¾"-wide, ⅜"-deep dadoes
2½"

The side panels for the short cabinet (left), made from ¾" plywood, differ in size. A line connecting the tops of the two panels should follow the slope line of the staircase. The side panels for the main cabinets (right), are also made from ¾" plywood, and have dadoes for the cabinet shelves and base, and rabbets for the cabinet top. The taller side panel for the small cabinet fits against a main cabinet side panel when the work center is installed.


Shelf
Shelf edging strip
Shelf cleat
Staircase shown cutaway

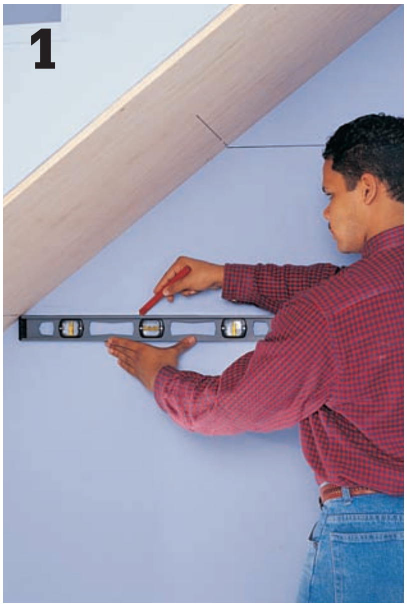
Shelves and cleats, made from plywood and 1 × 2 strips, are beveled so they fit flush against the understairs cover. The shelf edging strips are cut from oak 1 × 2, and mitered at the same angle as the shelves.



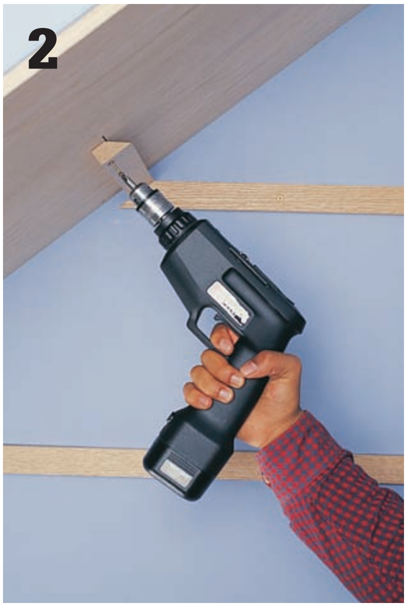
Duplicate the slope of your stairs using a T-bevel. Set one arm of the T-bevel in a level position against the back wall, then align the other arm with the stairs (top photo). Transfer the angle directly to your saw to make mitered and beveled cuts (bottom photo).

Cover stair underside before you install your understairs work center. Panels of 1¾" plywood attached to the stringers of the staircase create an understairs cover that can be used to anchor shelf cleats. If you plan to add electrical or plumbing lines, do the work (or hire a professional if you are inexperienced) before installing your built-in.

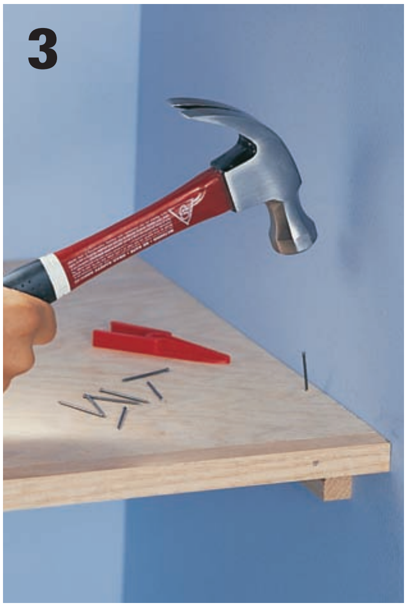
How to Build an Understairs Work Center



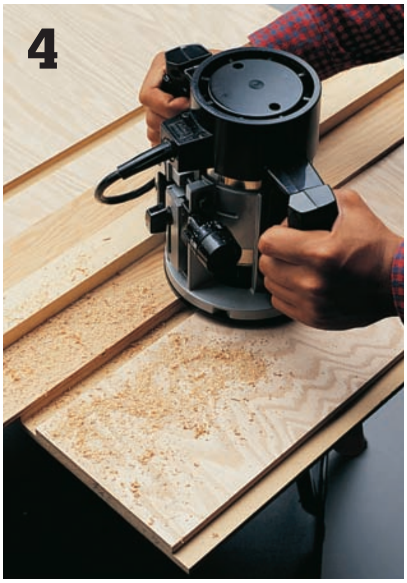
Mark the location for the shelf cleats on the walls and understairs cover, using a level as a guide. Butt the 12" cleats against the back wall, and allow at least 12" of clearance between the countertop and the bottom shelf.



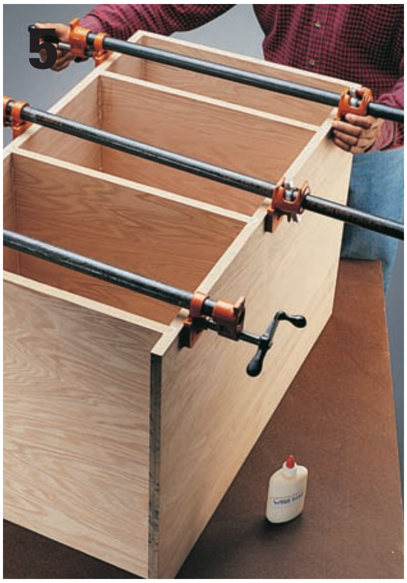
Measure and cut 1 × 2 shelf cleats to fit along the reference lines on the walls and the understairs cover (see Project Details, page opposite). Bevel the cleats on the understairs cover to match the stair slope angle. Attach the cleats with 2½" screws.



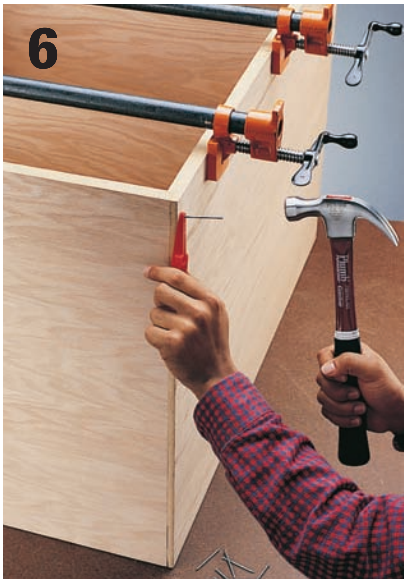
Measure and cut ¾" plywood shelves, then attach a ¾" hardwood strip to each shelf edge (see page opposite) using glue and finish nails. Set shelves on cleats and attach with 1½" finish nails driven through pilot holes.



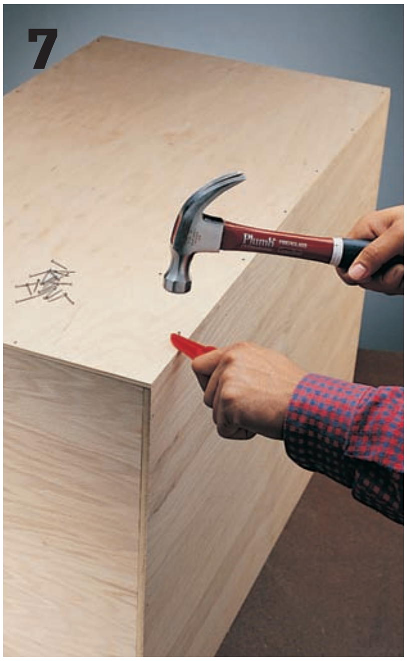
Measure and cut ¾" plywood side panels for main cabinets, then use a router and an edge guide to cut rabbets for top panels and dadoes for bottom panels and shelves (see Project Details, page opposite).



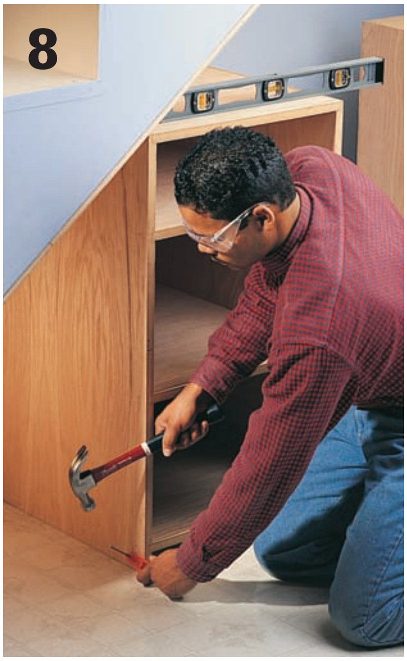
Clamp and glue the cabinet sides to the top and bottom panels and shelves to form rabbet and dado joints. *Note: If you plan to install center-mounted drawer slides, mount slide tracks before you assemble the cabinet.*



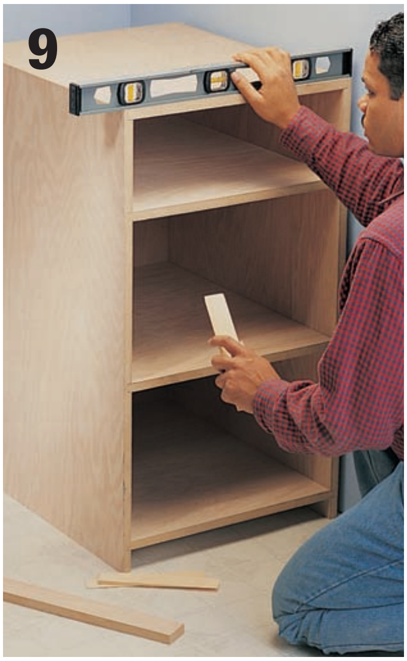
Reinforce each cabinet joint with 2" finish nails driven at 4" intervals.



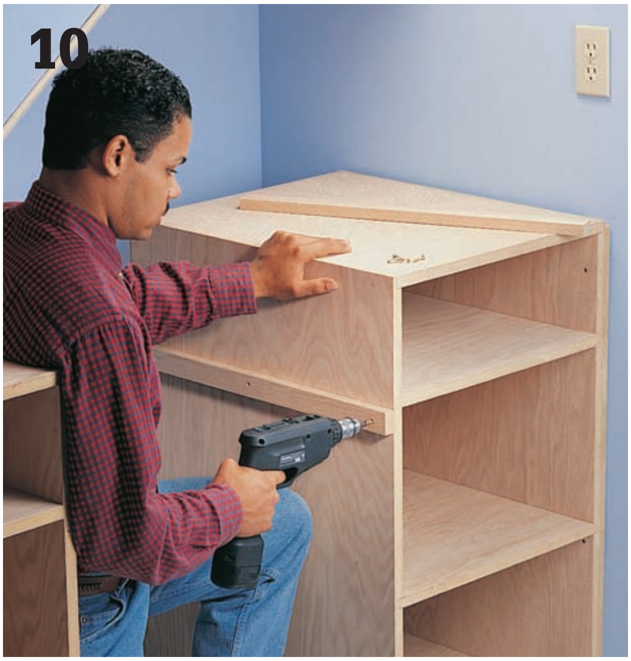
Cut a ¼" plywood back panel for each main cabinet. Set each back onto a cabinet frame so that all sides align, then attach them to cabinet side, base, and top panels using 1" wire nails.



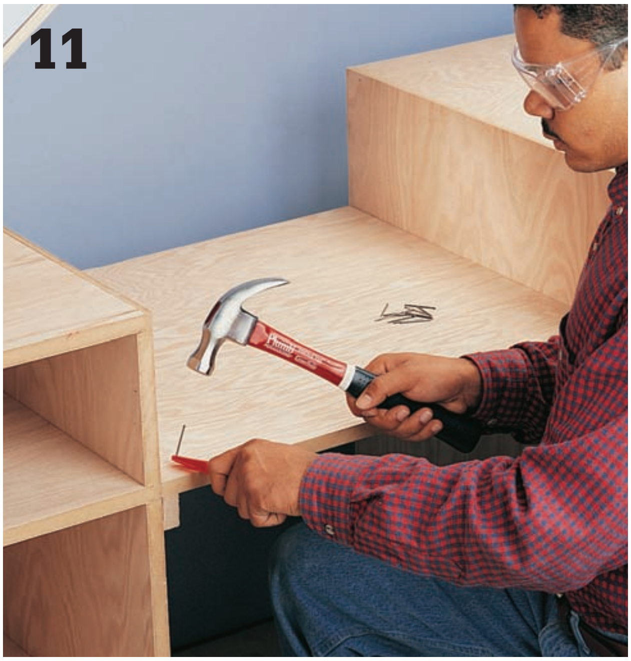
Position one cabinet so the top panel is pressed against the understairs cover and front face is flush with edge of stairway. Shim if needed, then toenail into the floor through the side panels, using 2" finish nails. For masonry floors, attach with construction adhesive.



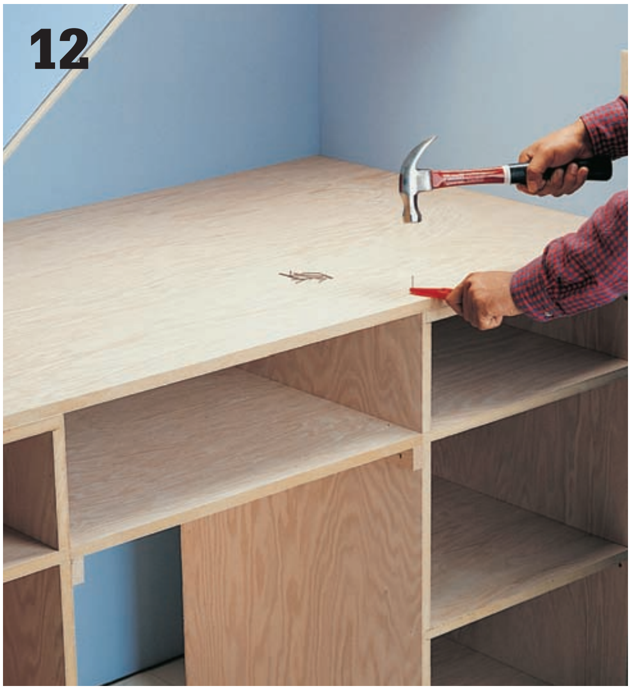
Position the other cabinet ¾" away from side wall, with front face aligned with first cabinet. Check with a level and shim if needed. Insert ¾" spacers between cabinet and side wall, then anchor to wall with 2" screws driven into framing members.



Cut 1 × 2 cleats for the connecting shelf that fits between the main cabinets. Mark level lines on the inner cabinet sides, then attach shelf cleats to the cabinet sides by driving 1¼" screws through counterbored pilot holes.

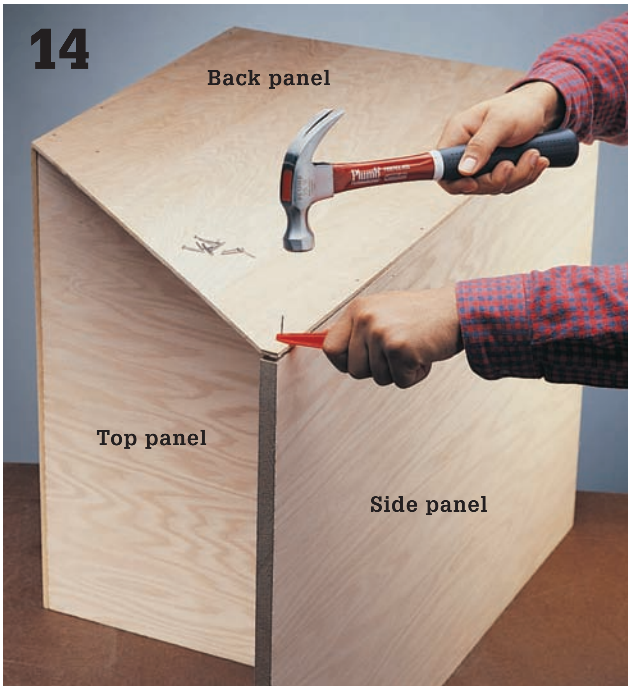


Measure and cut a ¾" plywood connecting shelf to fit between the cabinets, and attach it to the cleats with 1¼" finish nails. (If you plan to build a drawer using a center-mounted drawer slide, attach the slide track to the shelf before you attach the shelf to the cleats.)

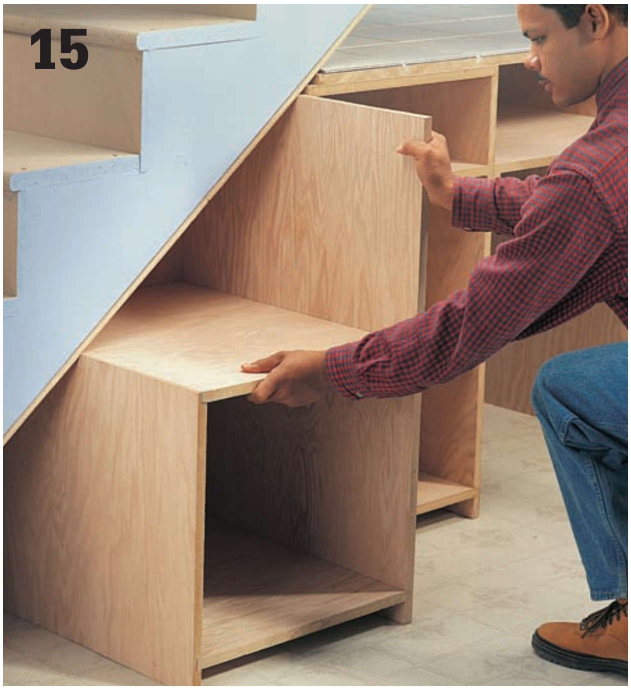


Measure and cut a plywood countertop panel that extends all the way to the back wall, with one side flush against the understairs cover. Attach the countertop to top panels of cabinets by driving finish nails down through the countertop.

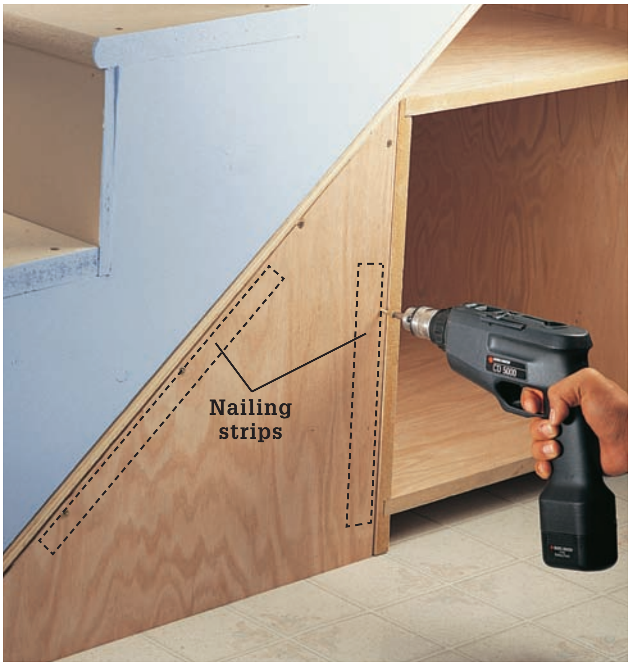
Apply or install any special countertop finishing material, like ceramic tile or plastic laminate. Obtain installation instructions and follow them carefully if you have not installed tile or laminate before.



Build a small cabinet the same width and depth as the main cabinets (steps 4 to 7). Adjust the height of the side panels to follow the stair slope (see Project Details, page 144). Cut a 1/4" plywood back panel, with the top edge sloped at the same angle as the line between the side panel tops. Attach the back panel to the cabinet with 1" wire nails.

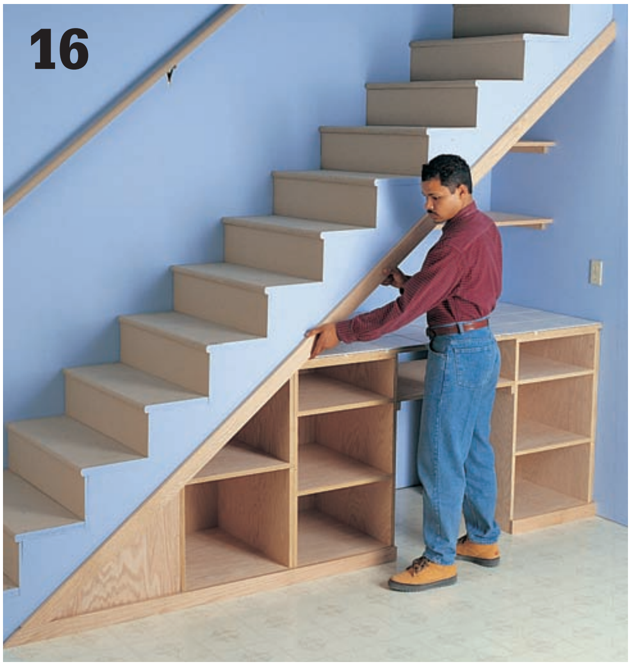


Position the small cabinet so the taller side panel is flush against the main cabinet. Align the face of the small cabinet with the face of the main cabinet, then check with a level, shimming if necessary. Connect the cabinets by drilling pilot holes, and driving 1 1/4" screws through the side panels.



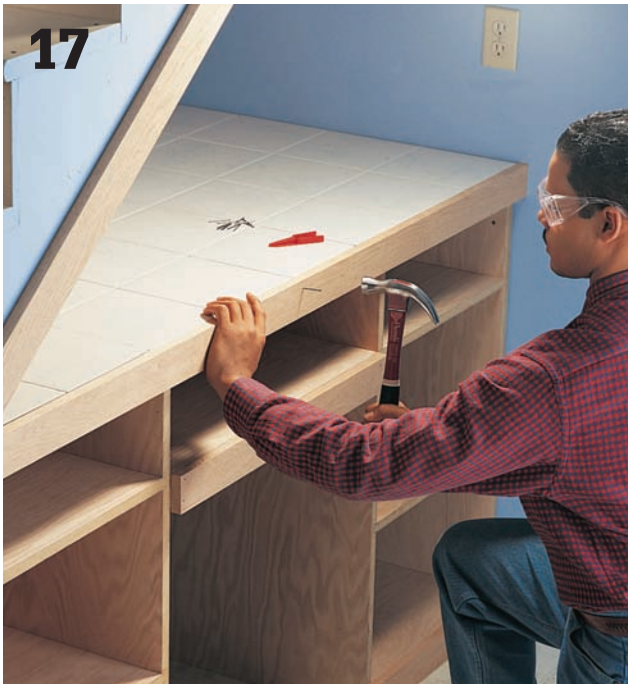
If the corner is open at the bottom of the stairs, attach nailing strips to the understairs cover and cabinet sides, then cut a plywood panel to fit the space, and attach it to the nailing strips with 1" screws.

16



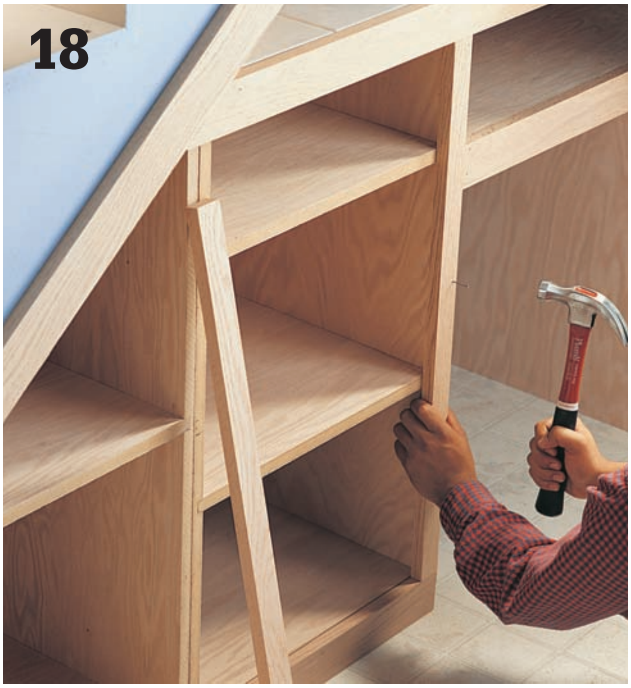
Measure and cut 1 × 3 bottom rails for the cabinets. Also cut a long, diagonal rail to fit along the edge of the understairs cover. Miter the ends of the diagonal rail to fit against the floor and the side wall, and miter the longer bottom rail to form a clean joint with the diagonal rail. Test-fit the rails, then attach them with glue and 2" finish nails driven through pilot holes.

17

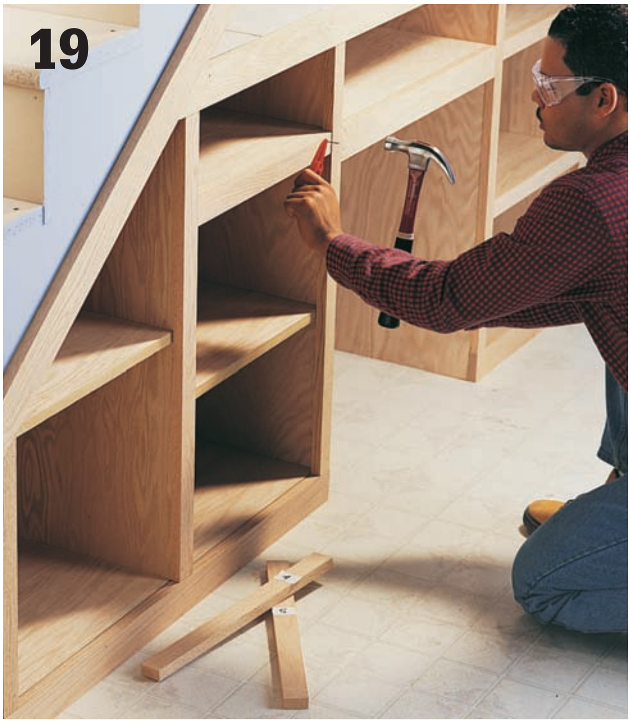


Measure and cut 1 × 3 rails to cover the edges of the connecting shelf and the countertop. Miter the end of the countertop rail that joins the long, diagonal rail. Attach the shelf and countertop rails flush with the countertop and shelf surfaces, using glue and 2" finish nails driven through pilot holes.

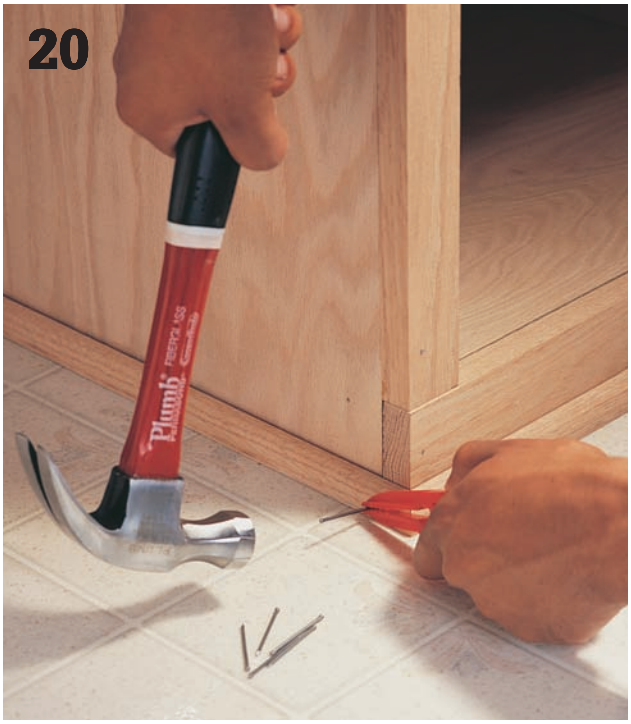
18



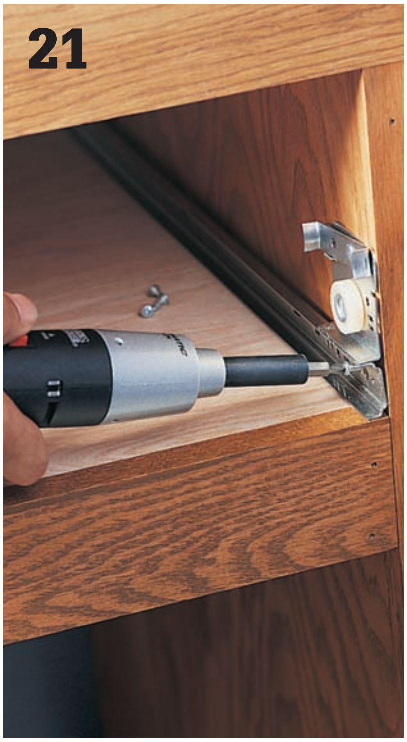
Measure and cut 1 × 2 stiles for the front edges of the cabinets. Attach the stiles, flush with the edges of the cabinet sides, using glue and 2" finish nails driven through pilot holes.



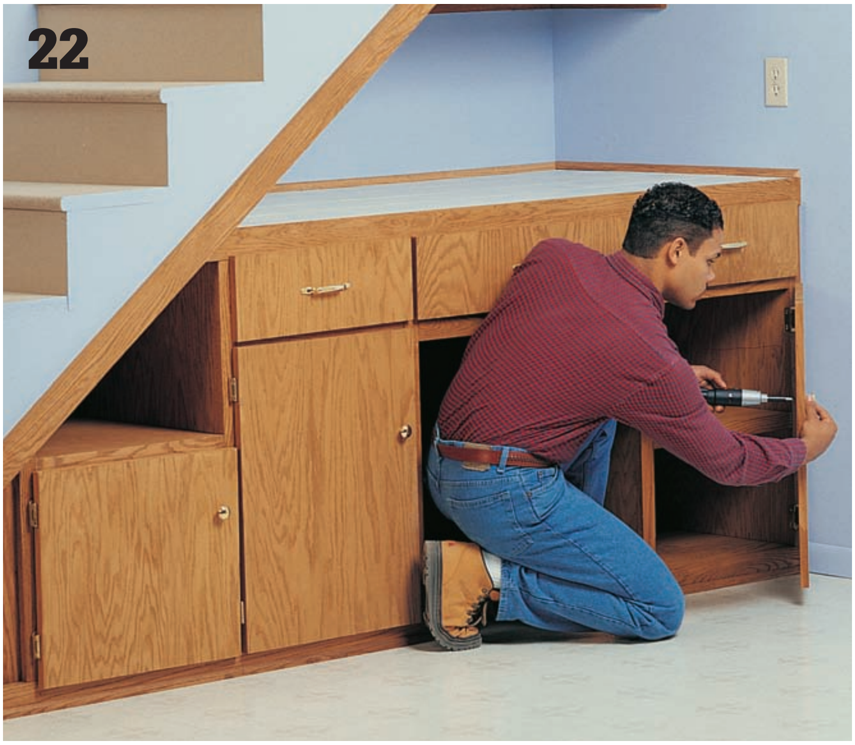
Measure and cut 1 × 2 rails to fit between the stiles, so they cover the cabinet shelf edges and are flush with the shelf tops. Attach the rails, using glue and 2" finish nails driven through pilot holes.



Cut base-shoe molding to cover gaps along wall and floor surfaces, mitering the corners. Tack the molding, using 2" finish nails. Sand, fill, and finish the understairs center.



Attach slide tracks for side-mounted drawer slides, according to the manufacturer's directions.

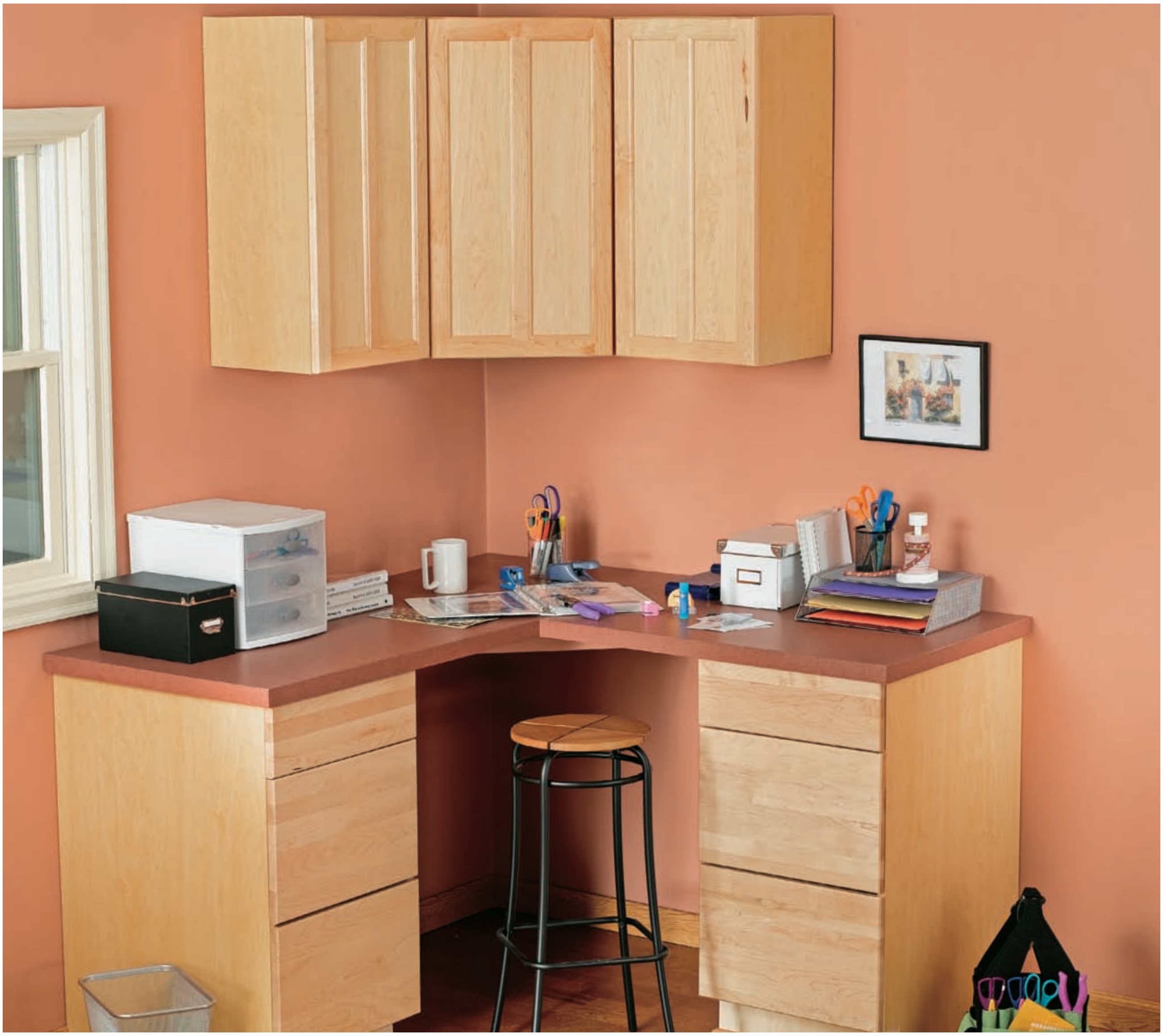


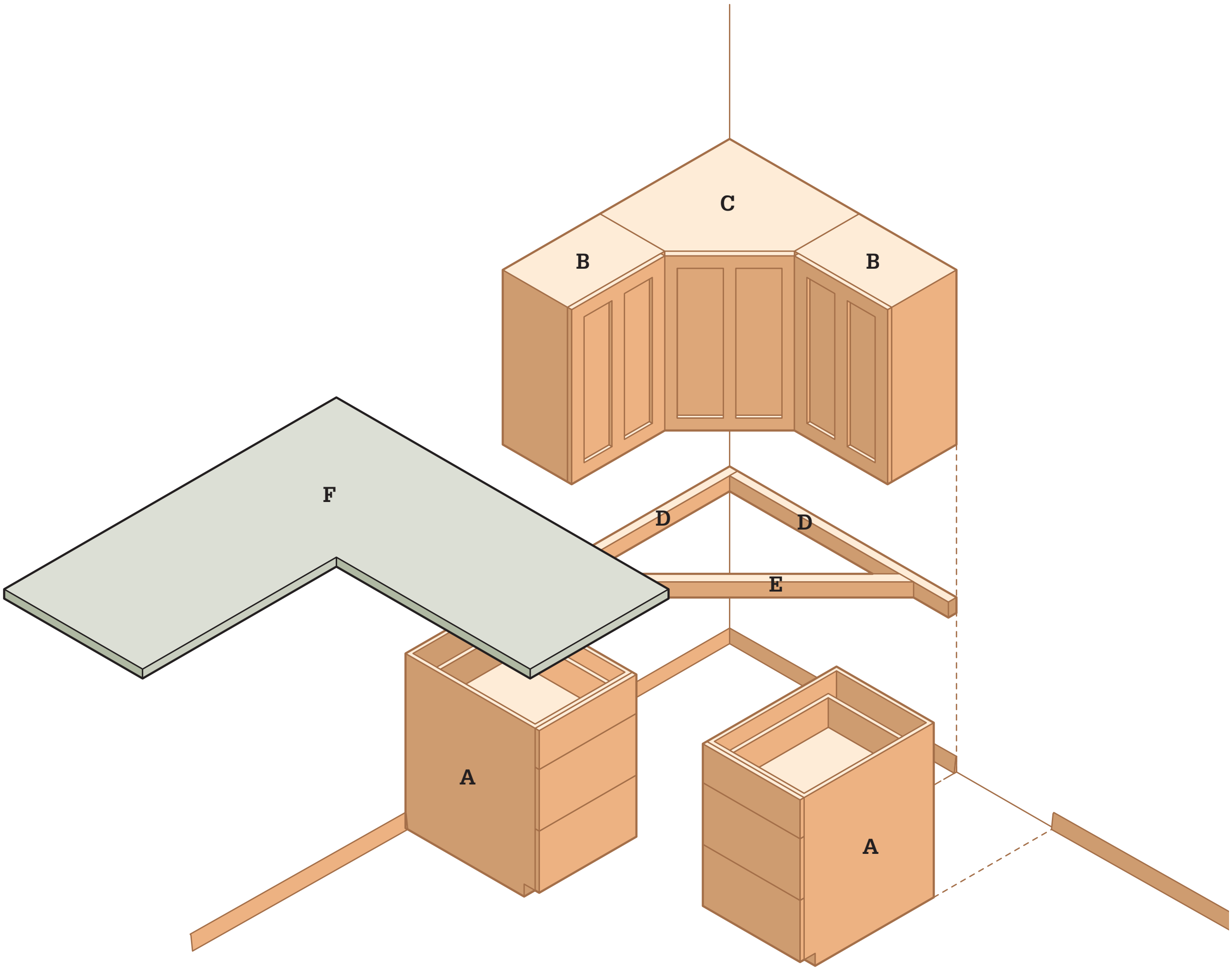
Build, finish, and install drawers (see pages 48 to 49) and drawer hardware. Purchase or build and finish cabinet doors and hang them using 3⁄8" semi-concealed hinges.

Hobby Center

If you or someone in your family enjoys a hobby or activity, whether it's computing, scrapbooking, drawing or anything else that involves pleasant time seated and engaged in your avocation, you deserve to have a special place set aside for that activity. And here, it is important to note, "set aside" does not mean "spread out on the kitchen table between family meals." A dedicated spot with loads of storage, a pleasing appearance and an efficient footprint can all be obtained with this corner hobby center provides the things you need to spend time on your activity, not managing it.

In this corner hobby center, upper and lower cabinets are combined to deliver excellent and attractive storage options. At the same time, some on-site carpentry creates a stable frame for a spacious but not overpowering L-shaped desk. The laminate desktop configuration provides not just room to spread out a project or stage supplies left and right, but also provides three access points (center, left, and right) for you to either move around a large project or for others to pull up a chair and help or just watch.





Tools

Pencil
Tape measure
Level or laser level
Drill/driver
Miter saw

Materials

(2) Base cabinets
(2) Upper cabinets
(1) Corner cabinet
(2) 8 ft. 2 × 3
(1) Countertop
Drywall or deck screws
Finish nails
Finishing materials

Cutting List

Part	No.	Desc.	Size	Material
A	2	Base cabinets	24 × 34½"	
B	2	Upper cabinets	18 × 30"	
C	1	Corner cabinet	24 × 30"	
D	2	Wall cleat	1½ × 2½ × 40"	2 × 3
E	1	Diagonal cleat	1½ × 2½ × 59"	2 × 3
F	1	L-shape Countertop	1½ × 25 × 72"	Custom make

How to Build a Hobby Center

LAY OUT UPPER CABINETS

Start with the upper cabinets first, then install the base units. Once the bases are set, frame the desktop supports and install the countertop. The desktop is laminate and while you can make it yourself, working with laminates is a specialty trade and it is often much easier to order the unit and have it delivered pre-assembled. Locate and strike the level line for the uppers 52½" above the floor. Project each line 42" out from the wall corner (photo 1).

Locate and mark the wall studs below the level line. Fasten a temporary ledger to the wall studs (photo 2). Set it below the level line to support the cabinets during installation.

LAY OUT THE BASES & DESKTOP

Measuring along the top of the base molding from the corner, make marks at 42" and 60" on the base trim. This is the location of each base cabinet. Use a combination square and mark square lines down to the floor. The 18" of base/shoe molding between the lines will be removed to accept the base cabinets. In the corner, measure up 34½" (the height of the base cabinet) from the floor and mark each side of the wall (photo 3).

1

Project the level line for the upper cabinets 42" out from each corner.

2

Fasten a ledger board for the upper cabinets just below the level line.

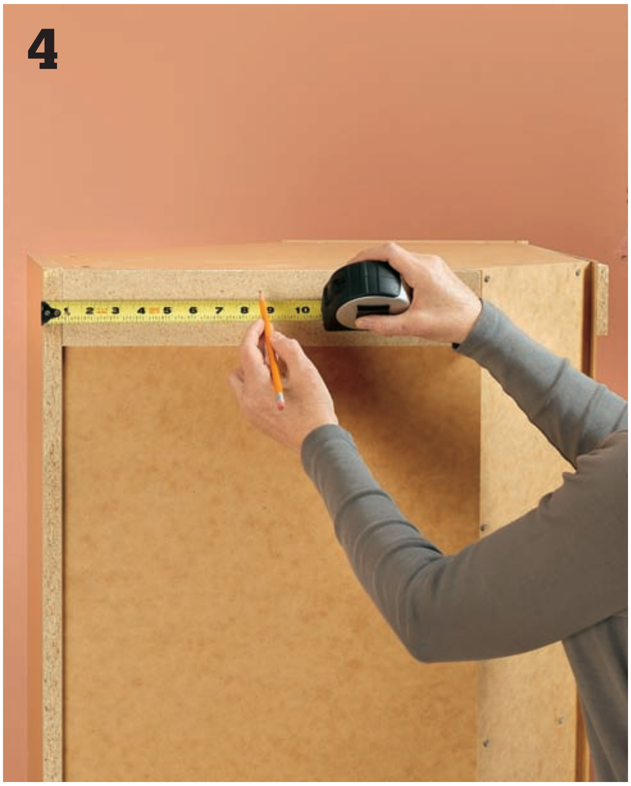
3

Extend your tape in the corner and mark each wall at 34½".

Plan Ahead ▸

If you can pre-gang and install the upper cabinets in one shot, this will provide a quicker, more accurate installation, but you'll need helpers to do this. It helps to transfer the location of the wall studs to the insides of the cabinets for future reference so you're not searching for the studs while you're holding cabinets aloft (photo 4).

4



Fasten the upper cabinet to the wall studs to hold it in place, but do not drive the screws all the way (this allows for a little fine tuning).

5

Transfer the stud locations to the inside surfaces of the cabinets before you lift them.

Note: If you have a carpet floor treatment, it may be wise to place a base cabinet in position and use a 2-ft. level to transfer its height to the wall. Remember, carpet and pad will compress some once the cabinet has been loaded with items so apply a little pressure when doing this. Once height is established, strike a level line 61½" out on each wall.

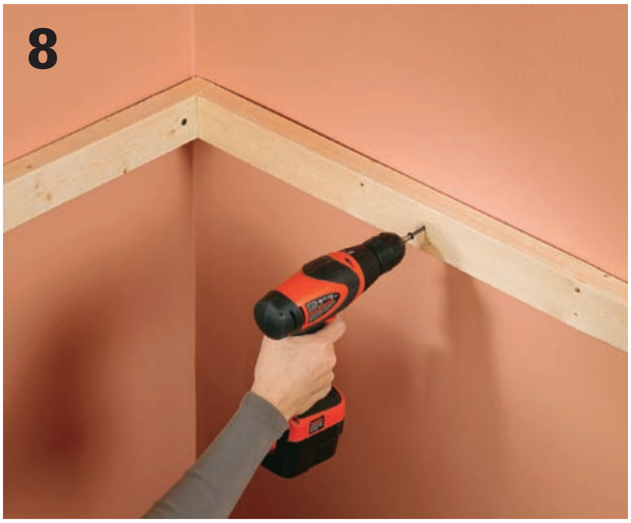
The reason to strike the line out to 61½-inches is because the desktop extends 1½" beyond the outside edge of the base unit. Along the level line on each wall, make a mark at 42" and strike a plumb-line down to the base molding. This is the inside edge of the base cabinet and the outside edge of the desktop ledger board. Locate the wall studs and mark them along the top edge of the level line.

INSTALL THE UPPERS

If you are installing one cabinet at a time, start with the center cabinet in the corner. Set it on the ledger board and then drive screws into the wall at stud locations (photo 5). Repeat for each end cabinet.

Before fully sinking wall screws, be sure the fronts of all wall cabinets are flush. Make adjustments as necessary to get them flush, clamp, pre-drill, then fasten.

Position the base cabinets at the layout lines and fasten them to wall studs with screws.



Install ledgers below level line on wall studs. Note that the second piece overlaps the first piece and must be cut 1½" shorter to fit.

Cut the diagonal ledger brace with opposing miters. Long-point to long-point, it's 59".

Before fully sinking the wall screws, clamp the cabinets together, drill pilot holes in the cabinet sides or face frames, and screw them together (photo 6). Complete the process by driving all wall screws tightly against the cabinet back. Add cabinet doors.

INSTALL THE BASE UNITS

Remove the base molding already marked using a pull-saw. Position the base units against the wall at the layout lines and then shim and fasten the base cabinets to the wall studs (photo 7). See pages 54 to 59 for more information on installing cabinets.

ATTACH DESKTOP LEDGER

Because the desktop is only supported by cabinets on the outside edges, you must build a 3-piece ledger system that supports the desktop both along the wall and under the front edge of the desktop. 2 × 3s work well for this. Cut and install ledger pieces along the wall, fastening with two 3" screws into the wall studs (photo 8). Measure and cut the first piece to fit between the wall and the inside edge of a base cabinet. A piece just shy of 42" should fit. Cut and install the second piece. A piece just shy of 40½" should fit.

Cut a 2 × 3 to 59" (long-to-long) with opposing miters (photo 9). Pre-drill and pre-set screws in the mitered ends of the diagonal brace then install (photo 10).

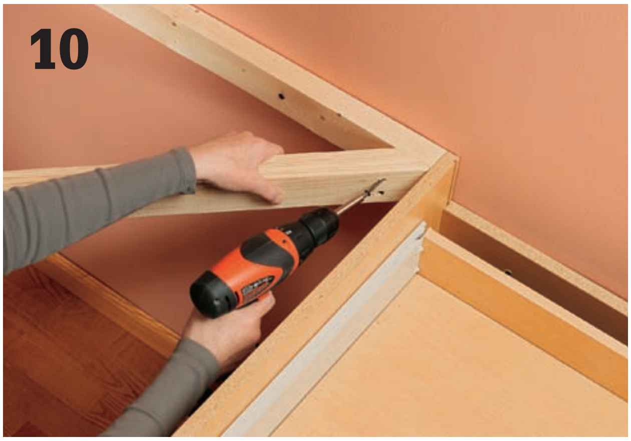
INSTALL THE DESKTOP

Have a custom desktop made to fit from particlebord and laminate, or any other suitable materials. Or, make your own (see pages 62 to 77). Get a helper and place the desktop on top of the base cabinet/ledger system (photo 11). Fine tune the desktop placement onto the layout marks and fasten from beneath. Fasten from inside the base cabinets as well as through the ledger system's diagonal brace. Fastening through the diagonal brace requires pre-drilling and installing screws on an angle (photo 12). Be careful not to puncture the top surface of the laminate.

APPLY YOUR FINISH

The finish details are relatively minimal on this project, since it is made out of prefinished cabinets and a pre-built desktop. You can caulk between the cabinet edges and the wall as necessary, or wrap the base cabinet bottoms with base molding as necessary (you can skip this if the floor is carpet) and prime and paint the ledger system boards the same as the wall color. One great addition is to install an undercabinet light beneath the upper cabinets to provide focused task lighting (photo 13).

10

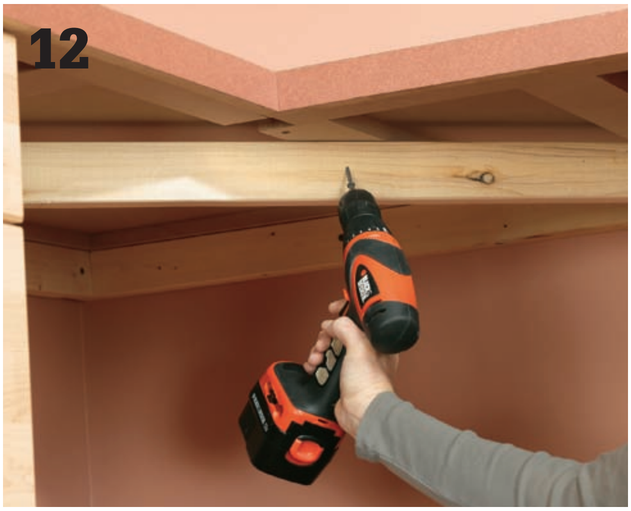


Pre-drill (to prevent splitting) and pre-set screws in the mitered ends of the diagonal brace and install.

11

With a helper, position the desktop on the cabinets and ledger system.

12



Pre-drill then drive screws at an angle through the diagonal brace into the desktop.

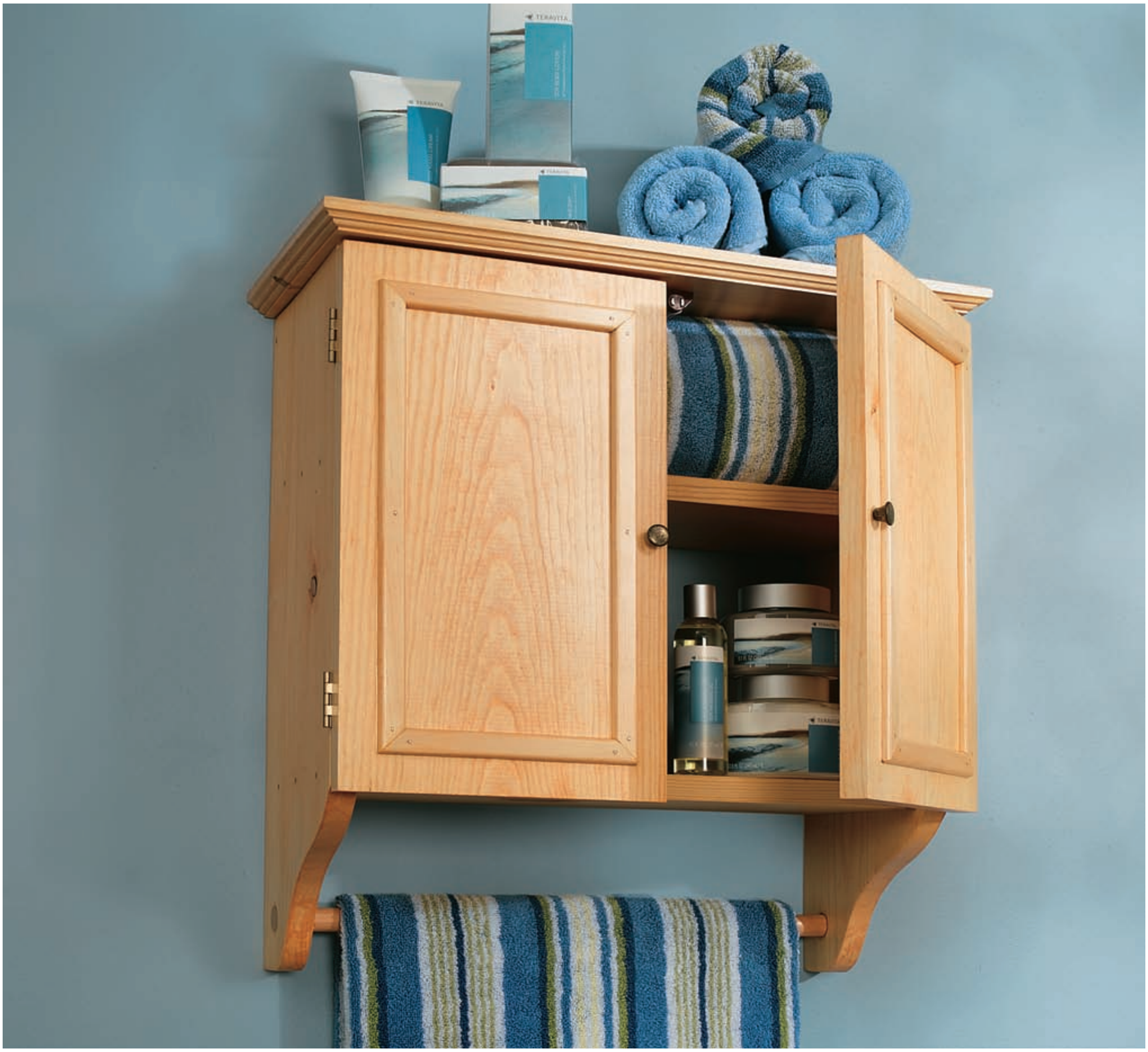
13

Install task lighting and add convenient receptacles according to your skill and comfort level with wiring.

Bath Cabinet

Cabinetry and casework are fundamental to making built-ins and bookcases. This small wall-hung cabinet is a useful item for bathroom or kitchen, and it is a great project for a beginning carpenter to develop some basic cabinetry skills. It is also extremely inexpensive to make. The entire case, including the top, can be built from an 8-ft.-long piece of 1 × 10 wood (you'll need a little extra material for the shelving and the towel rod). The mitered frames applied to the fronts of the door give the look and feel of a raised panel door, without any of the fuss.

We built the version of the cabinet you see here out of No. 2 and better pine and then gave it an orangey maple finish. You can choose any lumber you like for this, even sheet stock such as MDF, and apply a clear or a painted finish. For a traditional look, choose a white enamel paint. Be sure and apply several thin coats of polyurethane varnish, especially if the cabinet will be installed in a wet area like a bathroom.

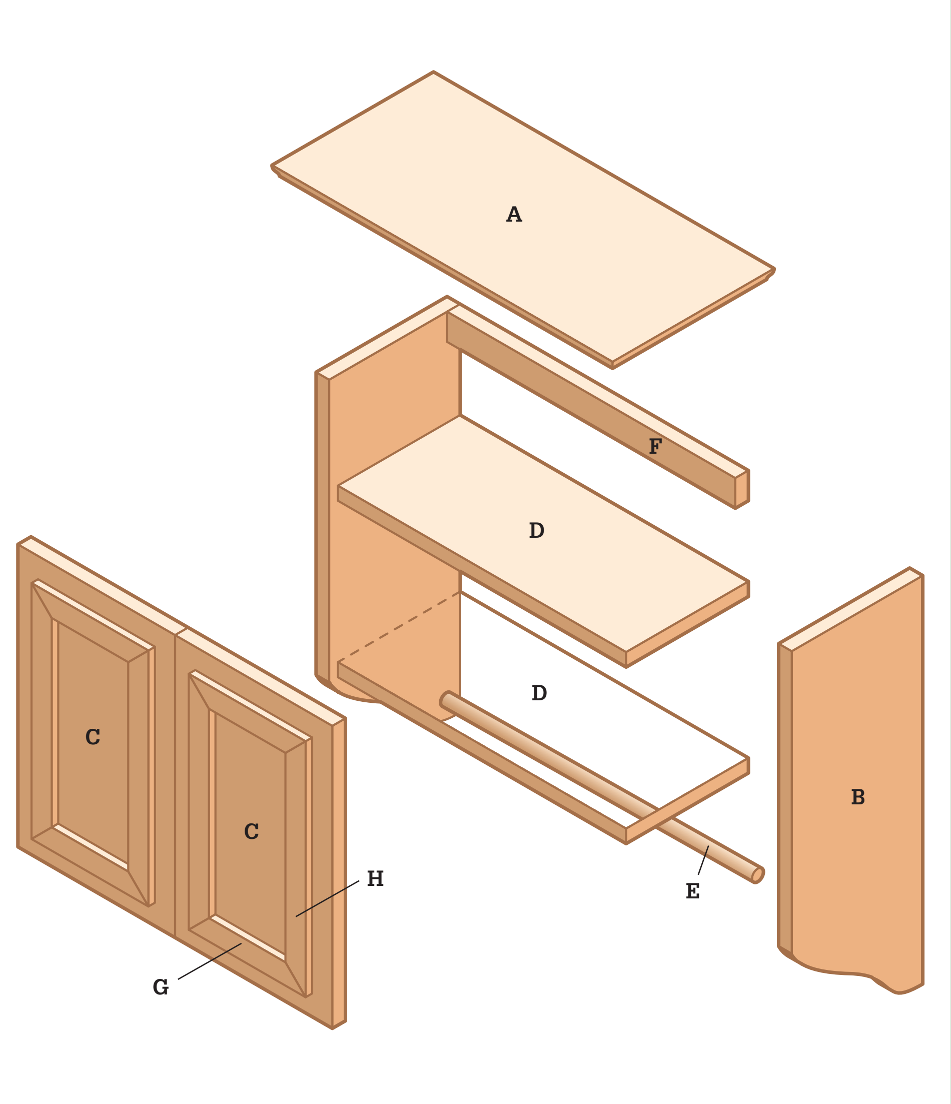


Tools

- Pencil
- Tape measure
- Combination square
- Router, profiling bit
- Circular saw
- Jig saw
- Clamps
- Hammers
- Drill/driver
- ¾" Spade bit

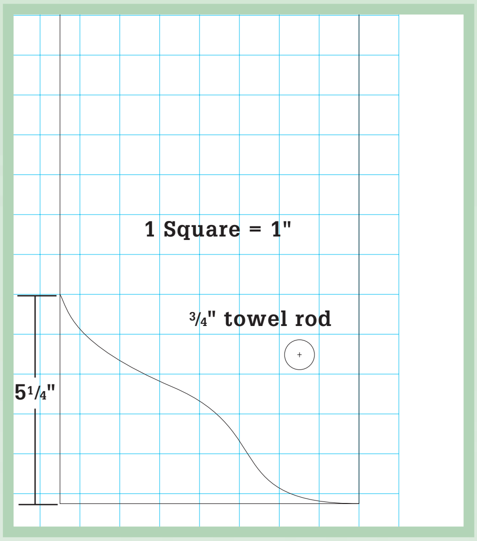
Materials

- (1) 8 ft. 1 × 10
- (1) 4 ft. 1 × 8
- (1) ¾" Dowel
- (1) Screen retainer molding (10 lineal ft.)
- (2) Door knobs
- (2) Touch latches
- (2) Hinges
- Drywall or deck screws
- Finish nails
- Finishing materials



Cutting List

Part	No.	Desc.	Size	Material
A	1	Top	¾ × 9¼ × 19½	1 × 10 pine
B	2	Sides	¾ × 7½ × 20¼	1 × 10 or 1 × 8 pine
C	2	Doors	¾ × 9 × 15	1 × 10 pine
D	2	Shelves	¾ × 7 × 16½	1 × 8 pine
E	1	Towel rod	¾ × 18"	Dowel
F	1	Wall cleat	¾ × 1½ × 16½	1 × 2 pine
G		Door molding (short)	¼ × ¾ × cut to fit	Retainer molding
H		Door molding (long)	¼ × ¾ × cut to fit	Retainer molding



How to Build a Bath Cabinet

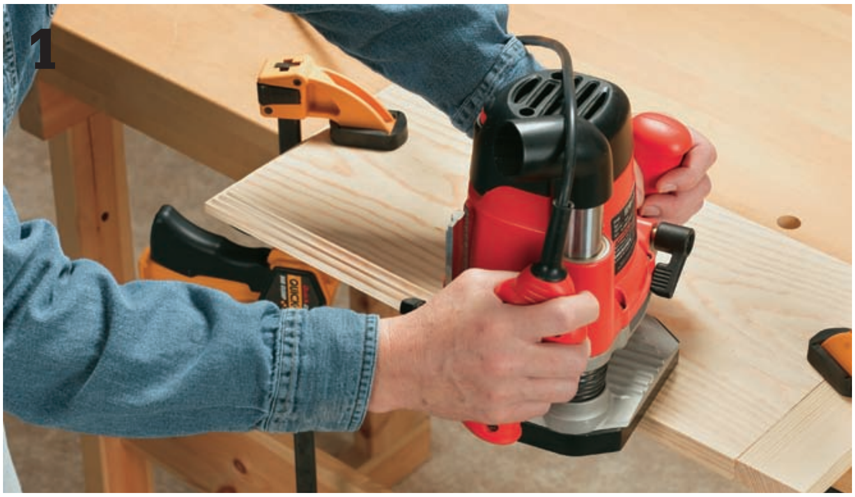
PREPARE THE STOCK

This bathroom cabinet can be made almost entirely from a single 8-ft. 1 × 10 using basic tools. (If you buy a 10-footer you'll have enough stock to make all but the middle shelf, which can easily be made from another piece of wood or even glass.) At your local lumberyard or building center, hand-select a board (pine or another wood: No. 2 or better pine is much cheaper than other types in most areas). Look for a board that's straight and free from defects like large knots or waney (bark-like) edges. When you get the board home, trim around ¼" off each end (never trust the factory ends- they're seldom squarely cut).

Cut the top board to 19½". Then, cut an ogee profile into the front edge and the side edges using a piloted ogee bit (photo 1). Be sure to attach blocking at the back edges to prevent the router bit from turning the corner and cutting into the back edge. If you don't own a router, you can simply hand-sand a roundover in the bottom edges or you can try cutting a chamfer profile with a hand plane (a tricky job, but a good skill to develop).

Next, cut the stock for both doors to length, plus a little bit (cut a piece around 30½" long) and either rip-cut the edges to get a clean surface on both sides or sand them or plane them smooth (photo 2). The final width of the material should be 9". Once the stock is prepared, cut the doors to length.

1



Shape a decorative profile into the top using a router and piloted ogee bit. Do not remove more than ¾" of material along the bottom edges.

2

Use a tablesaw, circular saw, plane or sander to get straight, crisp edges on the cabinet door stock.

Cut the stock for the cabinet sides to width (7½") or select a piece of 1 × 8 stock and simply sand the edges. Then enlarge the pattern on page 157 using a photocopier to make a hardboard template of the curved shape. Trace the profile on one side, referencing up from the bottom of the board (photo 3).

Clamp the two sides together so the ends and edges all are flush. Then, cut out the profile in both pieces at once using a jig saw (photo 4). Make your cuts just short of the cutting line. When the cut is finished, do not unclamp the ganged sides. Use a sander or a round file to smooth the cuts and remove waste wood exactly up to the cutting lines. An oscillating spindle sander is the best tool here. Another good idea is to mount a drum sander in a drill press. Lastly, before you unclamp the sides, locate the centerpoint for drilling the ¾"-dia. dowel hole for the towel rod. Drill the hole with a ¾" spade bit, making sure to slip a backer board underneath the bottom board to prevent tearout when the bit exits the workpiece (photo 5).

ASSEMBLE THE CABINET

Assembling your bathroom cabinet is a simple process of gluing, clamping and nailing. It is worth investing in a couple of 24" bar clamps or pipe clamps if you don't own them already, although another option is to use screws instead of nails to fasten the parts, relying on the screws to provide clamp-like pressure to the glue joints. Only do this if you are painting the cabinet.

3

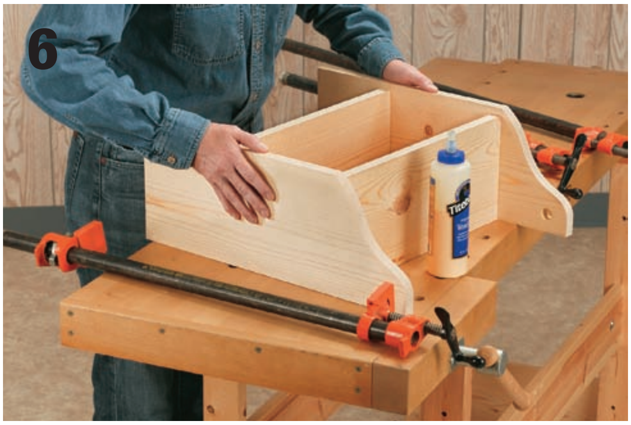
Photocopy the pattern on page 157 and use it to make a hardboard template a guide to trace the profile onto the bottom of one cabinet side.

4

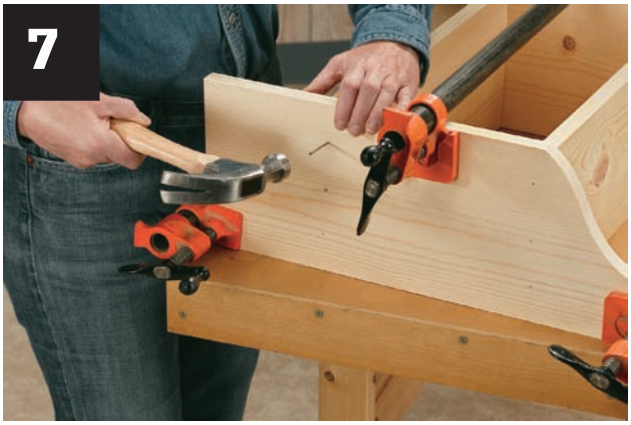
Cut both side profiles at the same time, staying just outside the cutting line so you can sand precisely up to the cutting line.

5

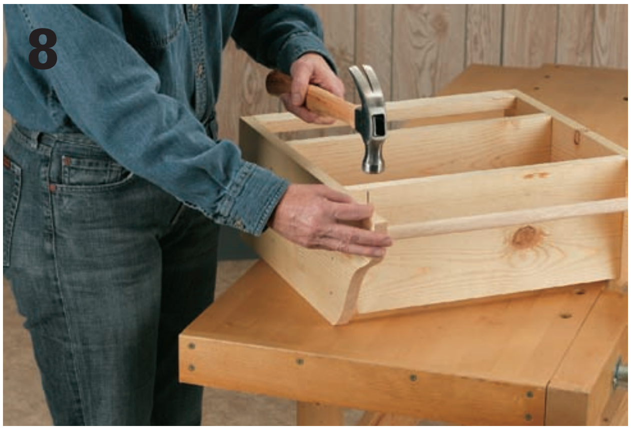
Still with the sides ganged together, drill a ¾"-dia. hole for the towel rod, using a backer board under the bottom side.



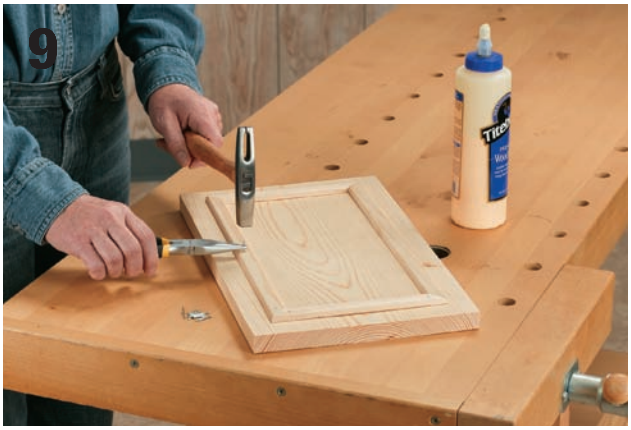
Press the two shelves and the cleat between the cabinet sides after applying glue to the ends.



Reinforce the glued joints with 6d finish nails driven into pilot holes.



Glue the ends of the towel rod into the holes in the cabinet sides and then pin it in place with a finish nail driven through the back edge of each side.



Miter the corners of screen retainer molding and nail and glue decorative frames to the door fronts.

Lay the side boards on a flat surface, lying parallel and on their back edges. Cut the 1 × 2 cleat and the 7"-wide shelves to length (16½"). *Note: The shelves are ½" narrower than the sides to provide clearance for the doors. Position the cleat and the shelves between the cabinet sides, making sure everything fits squarely. Then, apply wood glue to the ends of all three parts and clamp them between the cabinet sides (photo 6).* Then, clamp the sides with bar clamps and check with a framing square to make sure the sides are square to the shelves. Also make sure the middle shelf is perpendicular to the sides.

Before the glue sets (about 15 minutes) drive three 6d finish nails through the cabinet sides and into each shelf end. Drive a pair of nails into the wall cleat (photo 7). It is always a good idea to drill pilot holes for nailing. Insert the towel rod into the holes in the cabinet sides. Once it is in position, push it inward ½" or so on one side and apply glue to the inside surfaces of the dowel hole. Then, press the rod from the other side to reveal about ½" of the hole and apply glue. Push the rod so the ends are flush with the cabinet sides and the drive one 3d finish nail through the back edge of each cabinet side and into the dowel to pin it in place (photo 8).

HANG THE DOORS

Cut strips of half-round screen retainer molding to make decorative frames for the fronts of the cabinet doors. Miter the corners (photo 9). The frames should be inset 1" or so from the door edges on all sides. Attach the frames to the door fronts with glue and a few ½" wire brads.

Note: Now is a good time to finish or paint your bathroom cabinet. Be sure to sand all the surfaces well and make sure you remove any dried glue—the stain and finish won't stick to it. We used a gel-type Swedish maple stain on our pine cabinet because it imparts a rich color (it resembles orange shellac) and disguises the fact that pine has very little wood grain. We added three thin coats of wipe-on varnish after the stain dried (photo 10).

Hang the cabinet doors with 1½" brushed chrome or nickel butt hinges (photo 11). In most cases, you'll need to cut shallow mortises in the cabinet sides and door for the hinges. Center the cabinet top so the overhang is equal on the side and the back is flush with the cabinet back. Attach the top by driving a few finish nails through it and into the top edges of the cabinet sides, as well as into the top edges of the wall cleat (photo 12). You're better off not using glue to attach the top.

Install a touch latch at the top of each door opening.

HANG THE CABINET

Locate wall studs in the installation area. Where possible, position the cabinet so it hits two studs. Attach the cabinet with wood screws driven through the wall cleat and into the studs (photo 13). If you only have one stud available, drill a ¼" hole through the cleat, as far from stud location as you can get and still have access. Position the cabinet against the wall and mark the hole onto the wall by inserting a finish nail into the hole. Remove the cabinet and install a plastic screw insert at the hole location. Replace the cabinet and drive a screw so it catches the insert. Then re-level the cabinet and screw the wall cleat to the wall at the stud location. Drill pilot holes in the doors and install door knobs with screws.

10

Apply your finish or paint the cabinet before you hang the doors and install the cabinet top.

11

Hang the doors. Use care to position the doors so the outside edges are flush with the outer faces of the cabinets sides. The tops should be about ⅛" below the top edges of the cabinet sides.

12

Attach the finished cabinet top to the cabinet sides with 4d finish nails.

13

Hang the cabinet. If you don't have access to two wall studs, use a plastic screw insert or other hanging hardware in addition to fastening the wall cleat to a wall stud.

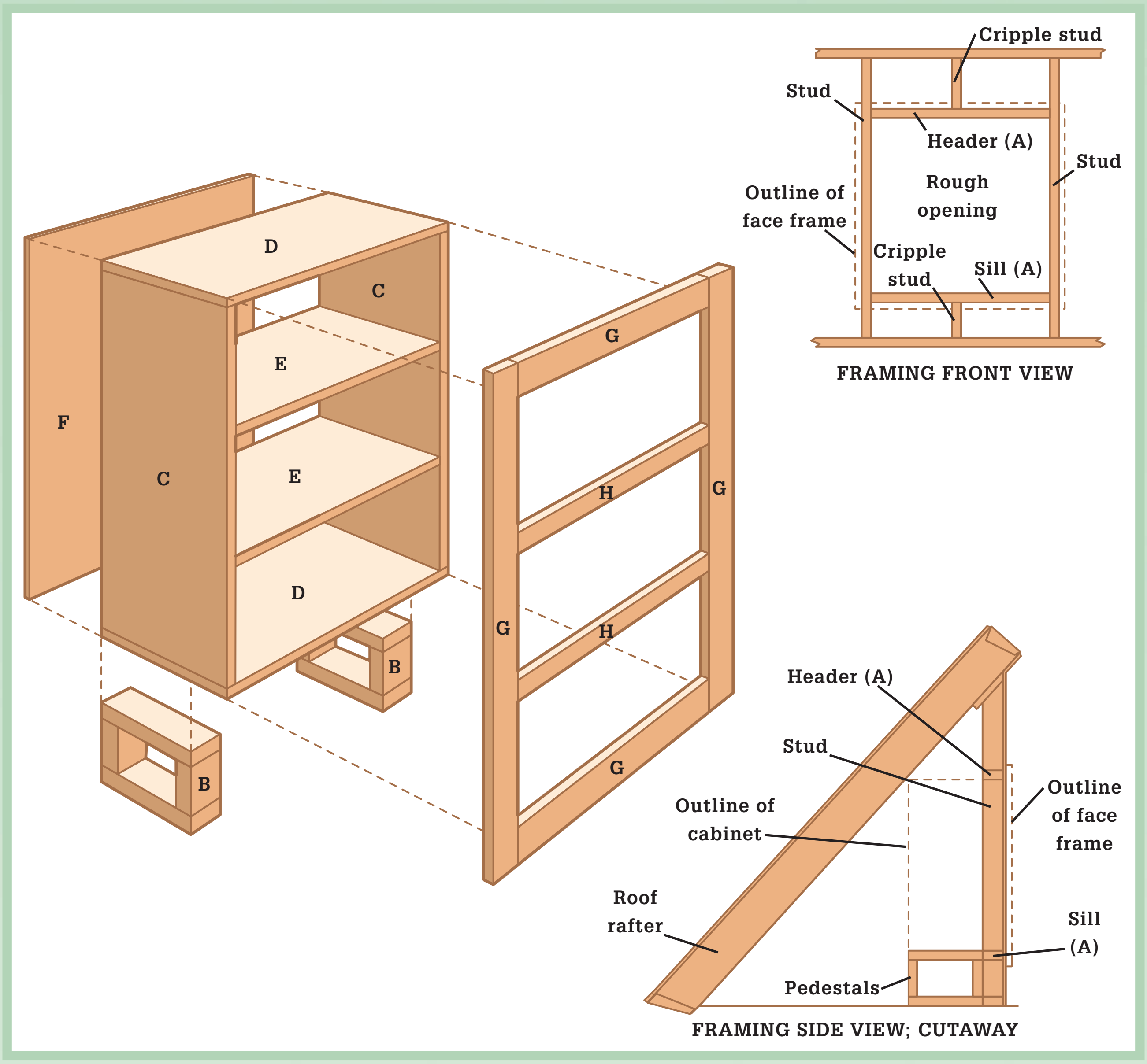
Kneewall Cabinet

A kneewall is a short wall that meets the slope of the roofline in an upstairs room. By cutting a hole in a kneewall and installing a recessed cabinet, you can turn the wasted space behind it into a useful storage area.

Because the body (carcase) of a kneewall cabinet is not visible, it can be built using ordinary plywood and simple butt joints. The face frame and drawer faces, however, should be built with hardwood, and finished carefully.

The project shown here fits in a space that is 30" wide—the standard width of two adjacent stud cavities with a center stud removed. Before beginning work, check the spacing of studs and the location of electrical or plumbing lines behind your kneewall. Your kneewall may have a removable access panel, which makes it easy to check behind the wall.

You can make the cabinet wider or narrower to fit your wall stud spacing, but regardless of size, be sure to leave a few inches of space between the back of the cabinet and the rafters.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Stud
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Stud
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face frame
Rough
opening
Cripple
stud
Sill (A)
FRAMING FRONT VIEW
Header (A)
Stud
Outline of
cabinet
Outline
of face
frame
Roof
rafter
Sill
(A)
Pedestals
FRAMING SIDE VIEW; CUTAWAY

Tools

- Level
- Circular saw or jig saw
- Flat pry bar
- Reciprocating saw
- Drill
- Tape measure
- Bar or pipe clamps
- Hammer
- Nail set

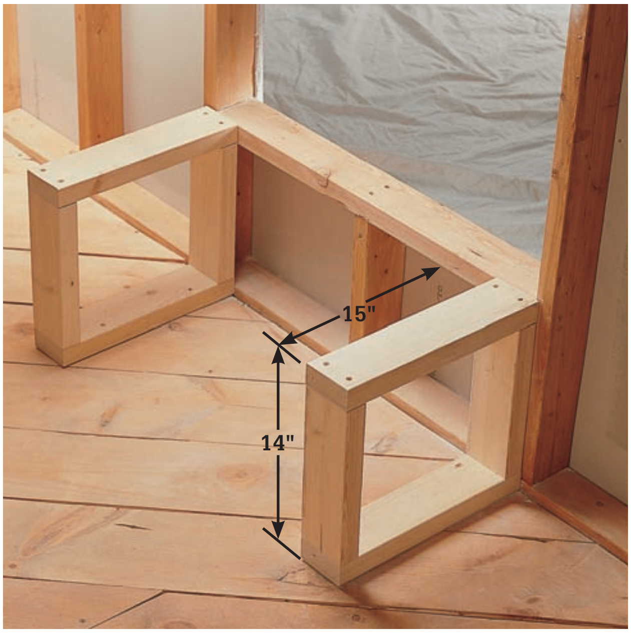
Materials

- Drywall or deck screws (1", 2", 3")
- Finish nails (1½", 2", 3")
- Wood glue
- Finishing materials
- Drawer hardware

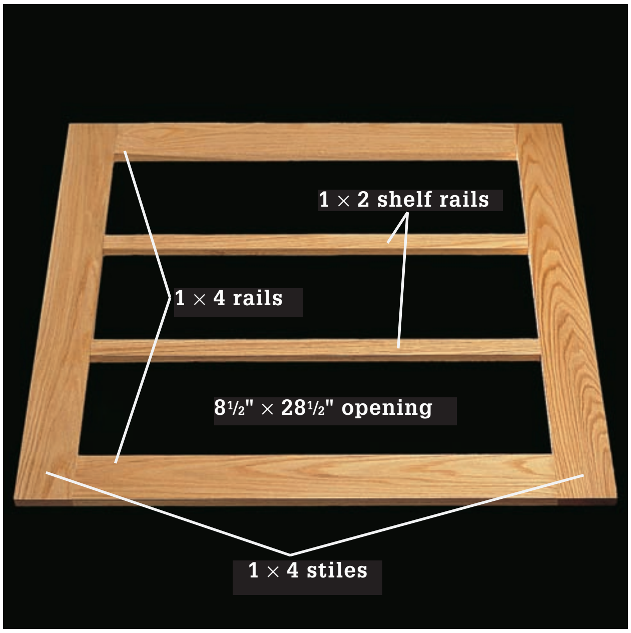
Cutting List

Part	No.	Desc.	Size	Material
A		Header and sill	6 linear ft.	2 × 4s
B	2	Pedestals	14" × 15"	2 × 4s
C	2	Sides	19" × 28½"	¾" plywood
D	2	Top and bottom	19" × 30"	¾" plywood
E	2	Shelves	19" × 28½"	¾" plywood
F	1	Back panel	30" × 30"	¼" plywood
G		Face frame	11 linear ft.	1 × 4 oak
H		Shelf rails	5 linear ft.	1 × 2 oak
I		Drawers	see pages 48 to 49	

KNEEWALL CABINET PROJECT DETAILS

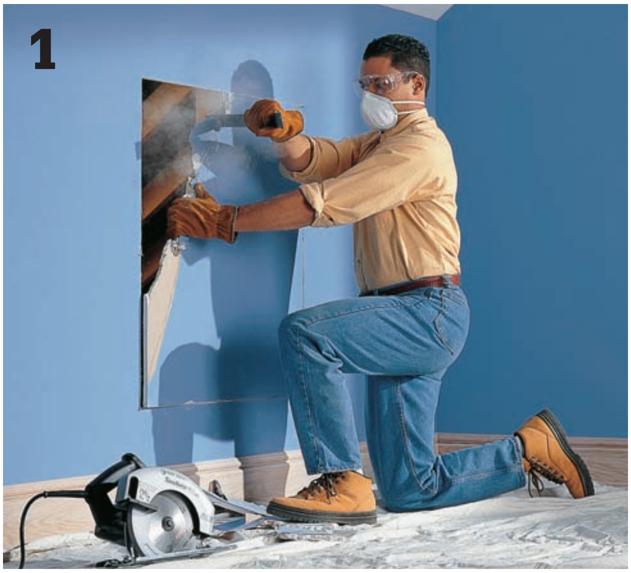


Pedestals installed behind the kneewall create a sturdy base for the cabinet. Built from 2 × 4s, the pedestals raise the cabinet so it fits above the sill. Raising the cabinet also makes drawers more accessible.

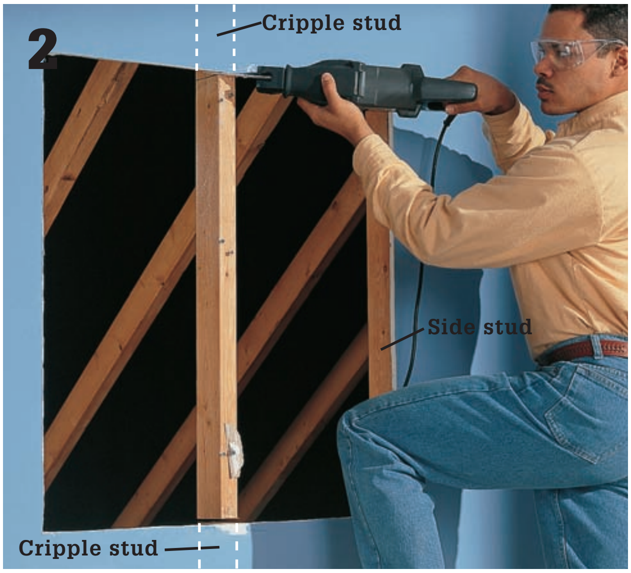


Face frame is 1 × 4 hardwood, which will cover the rough edges of the wall opening. The shelf rails are made from 1 × 2 hardwood to maximize the size of the drawer openings.

How to Build a Kneewall Cabinet

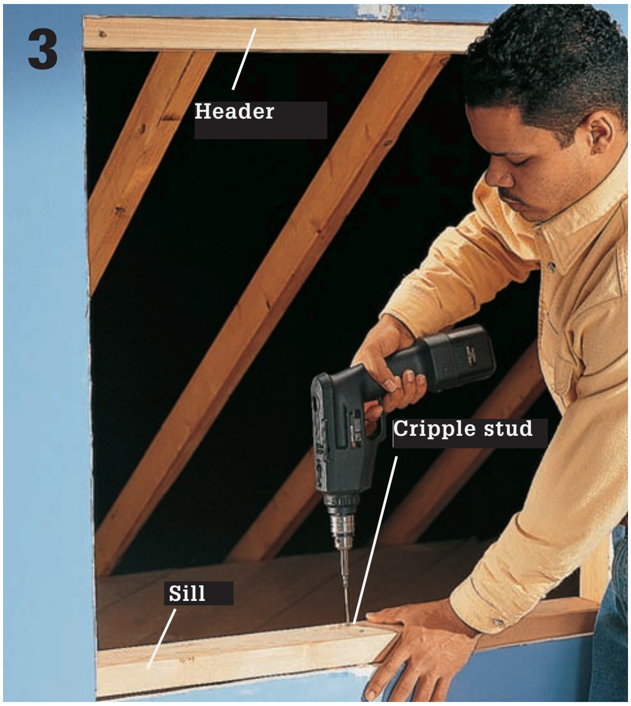


Locate wall studs in area where cabinet will be installed. Mark the cutout on the wall, using a level as a guide. Bottom of cutout should be at least 3" above baseboard, and sides of cutout should follow edges of wall studs. Height of cutout should be 3¼" taller than overall height of cabinet, to allow space for a header and sill. Caution: Check for wiring, pipes, and ductwork before cutting into any wall.



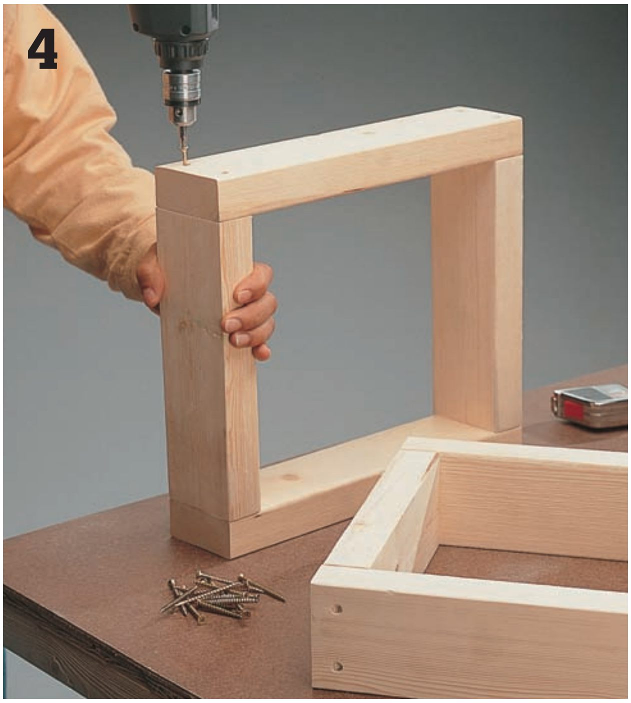
Cut away the center stud at the top and bottom of the opening, using a reciprocating saw. Remove the stud. Remaining portions of cut studs are called "cripple" studs.

3



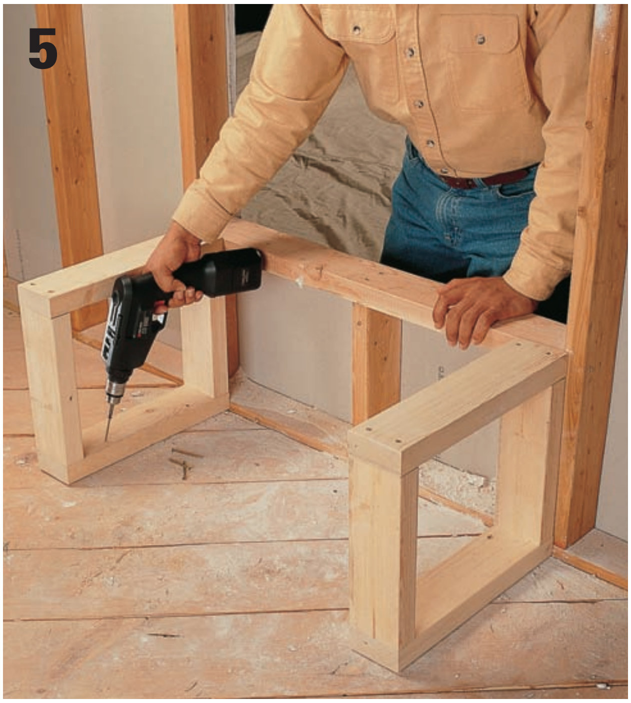
Measure and cut a 2 × 4 header and sill to fit snugly between side studs. Position in opening, check for level, and shim if necessary. Attach the header and sill to the cripple studs and side studs, using 3" screws.

4



Measure the distance from the floor behind the opening to the top of the sill, and build two 2 × 4 pedestals to this height (see Project Details, previous page). Join pedestal pieces together with glue and 3" screws.

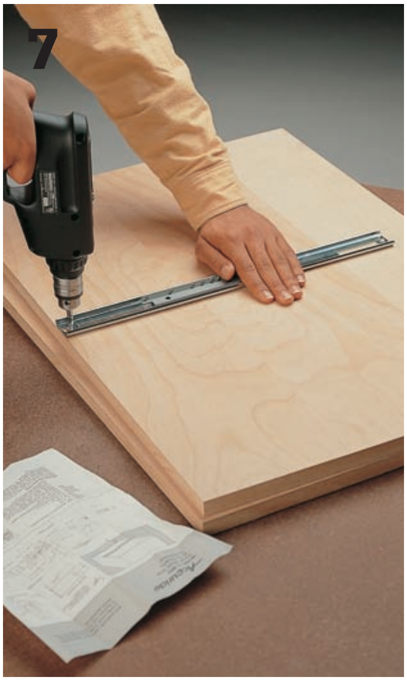
5



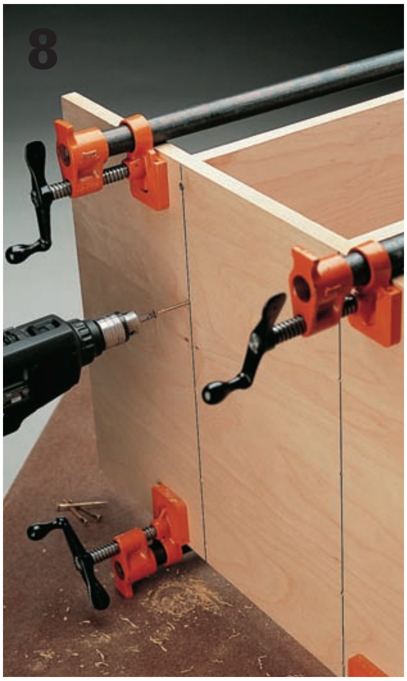
Set the pedestals on the floor inside the wall opening, even with the sides of the framed opening. Check to make sure pedestals are level, and shim between the pedestals and the floor if necessary. Attach pedestals to the floor, using 3" screws.

6

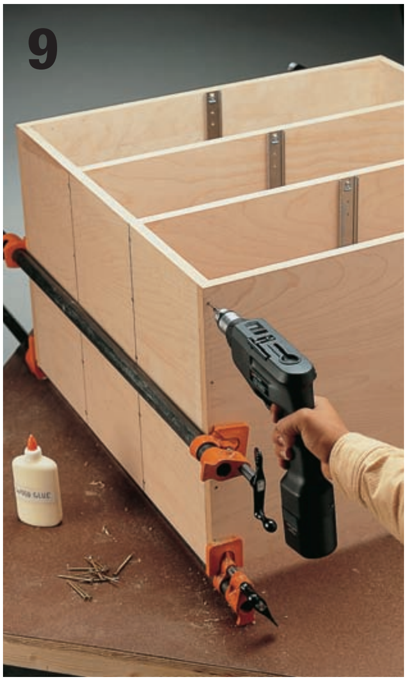
Measure width and height of the rough opening between framing members. Cut side panels 2" shorter than the height of rough opening. Cut top and bottom panels ½" shorter than the width of rough opening. Cut shelves 1½" shorter than the width of the opening.



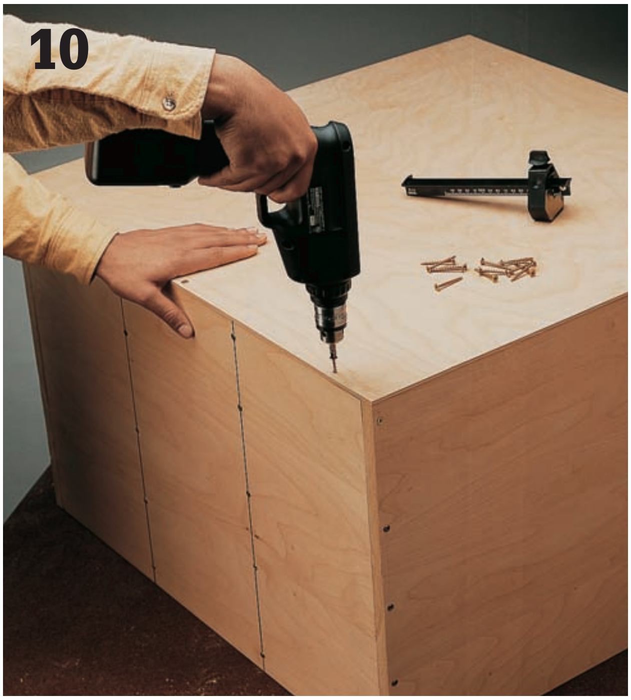
Attach drawer slide tracks to the center of the bottom panel and the shelves, following manufacturer's directions.



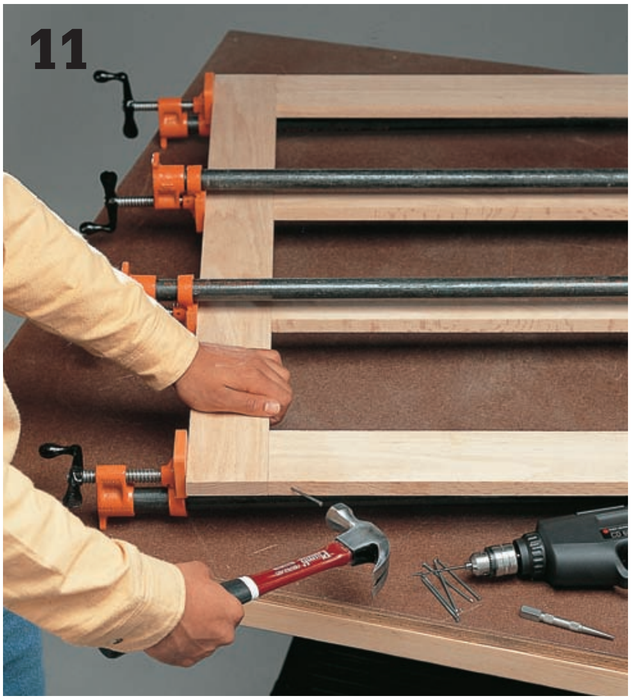
Clamp and glue the shelves to the side panels to form butt joints. Reinforce the joints with 2" screws driven through the side panels and into the edges of shelves.



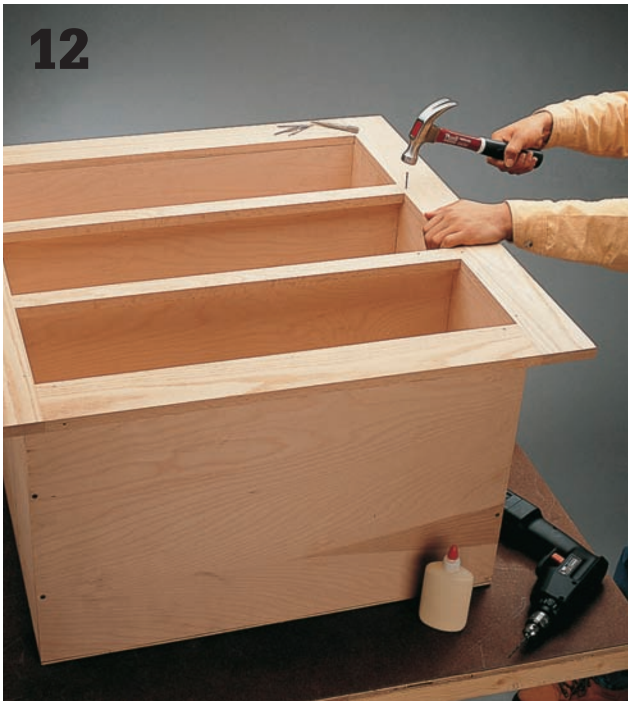
Clamp and glue the top and bottom panels to the side panels, then reinforce the joints with 2" screws.



Measure and cut ¼" plywood panel to cover the back of the cabinet. Attach with 1" screws or wire nails driven through the back and into the side, top, and bottom panels.

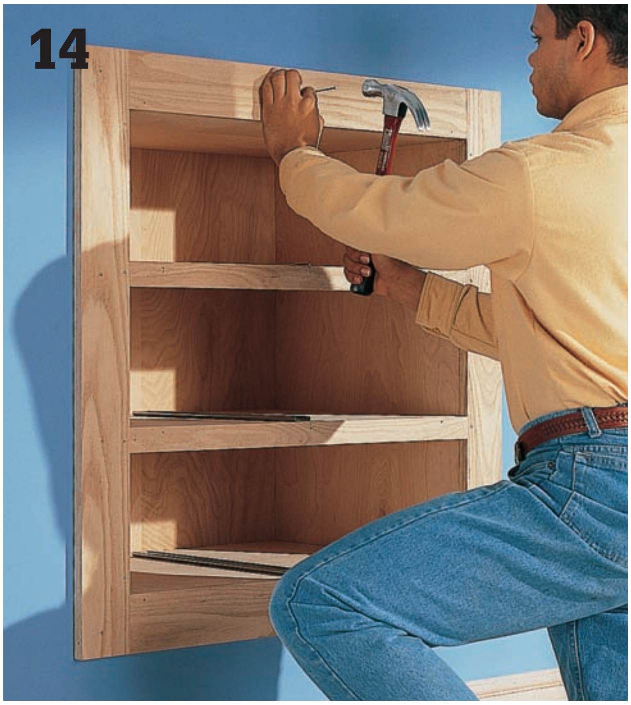


Measure the width and height between the inside edges of the cabinet. Cut the rails to the width. Cut the stiles to the height plus 7". Clamp and glue rails between stiles, and reinforce joints by toenailing 3" finish nails through the rails and into the stiles.

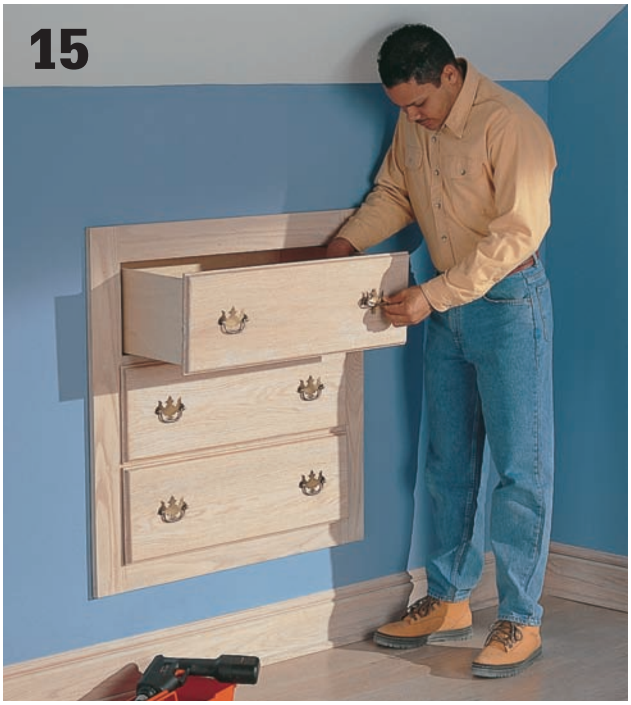


Apply glue to the edges of the cabinet, then position the face frame over the cabinet so the inside edges of the face frame are flush with the top, bottom, and side panels. Attach the face frame by drilling pilot holes and driving 1½" finish nails into the cabinet every 8". Use a nail set to countersink the nail heads.

Slide the cabinet into the opening so it rests on the pedestals and the face frame is against the wall surface.



Anchor the cabinet by drilling pilot holes and driving 3" finish nails through the face frame and into the wall framing members. Also, drive 3" finish nails through the bottom of the cabinet and into the sill.



Sand and finish the cabinet face frame, then build, finish, and install overlay drawers (pages 48 to 49).

Club Bar

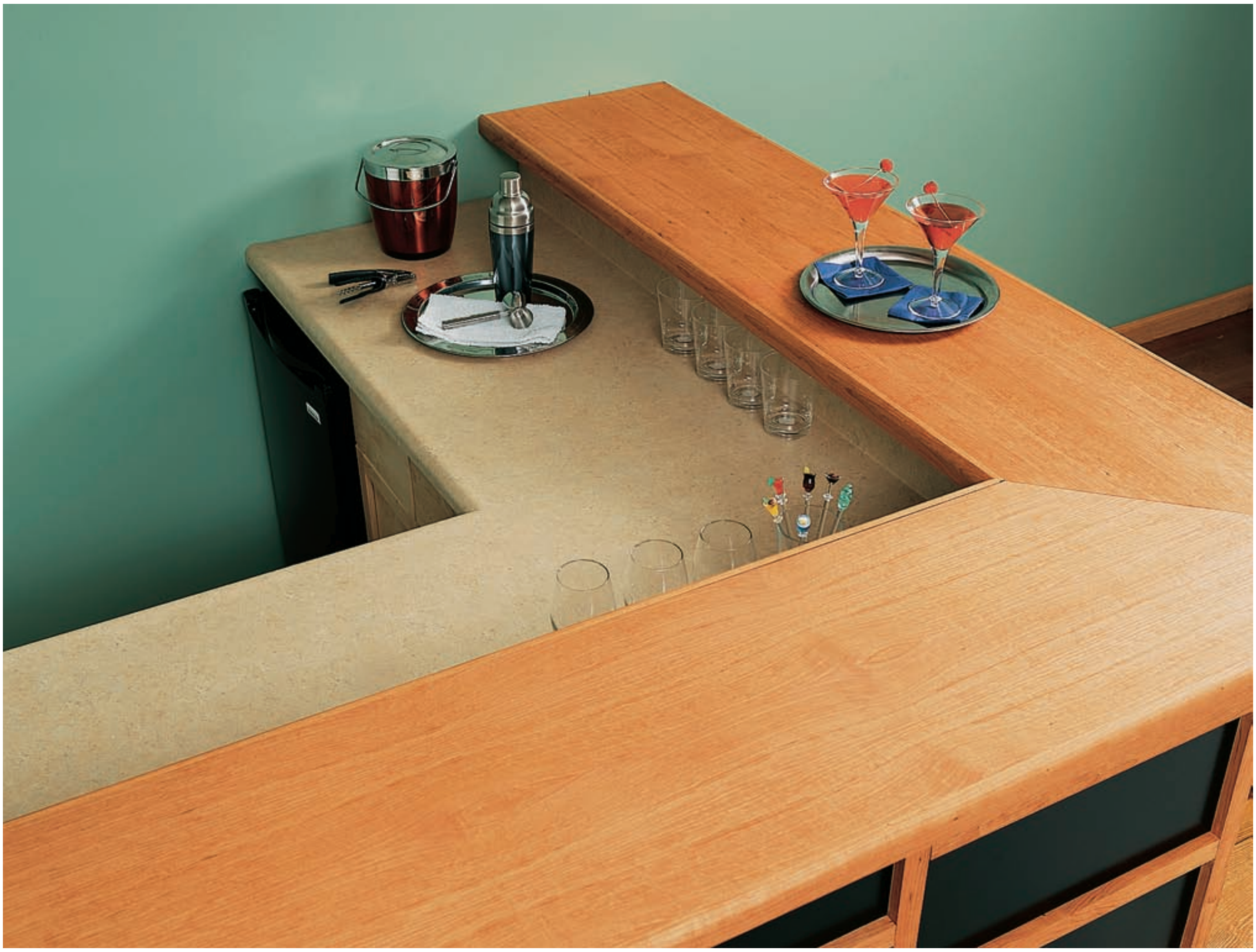
Owning your own in-house bar makes a statement about you. For some, it might say "I have arrived and this is my space!" While for others a bar might say "Welcome, friends, our home is your home." And for others, well, let's just say the possibilities are fairly wide-ranging. But whatever story your bar tells—be it one of quiet aperitifs before dining, casual afternoons watching the big game, or raucous evenings of wild revelry—building your bar yourself personalizes the tale and adds a feature to your home that will have a direct impact on how well you enjoy your home life.

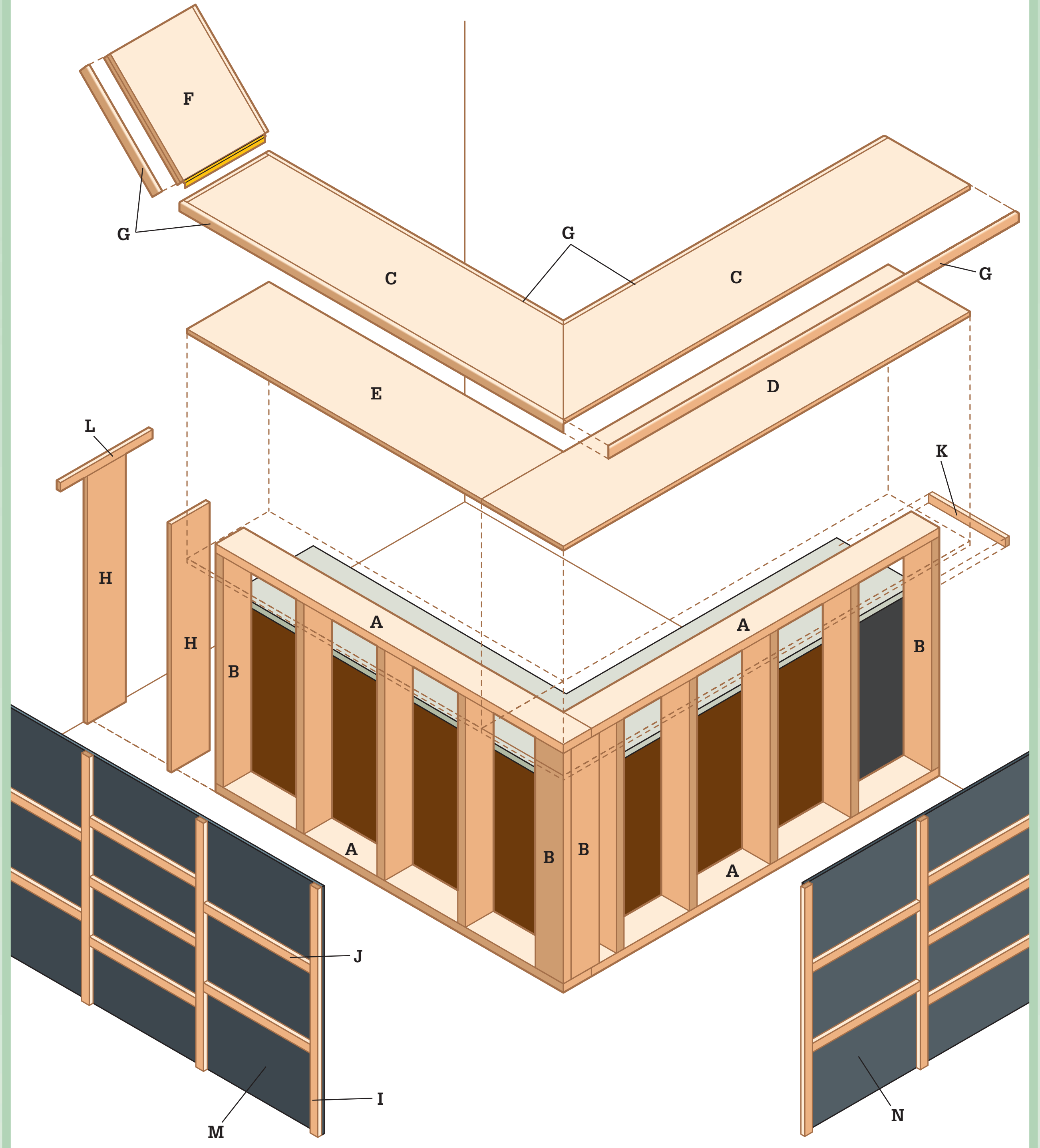
The bar shown here is sleekly styled and smartly laid out for the efficient barkeeper. A small refrigerator gives you access to cold drinks and ice while convenient cabinets create excellent storage spots for party favors.

While this is a "dry bar" (no plumbing), the design could be modified in any number of ways to add running water if you wish. All you need to get the party started is a GFCI electrical outlet and the proper floor space.

This compact corner bar design features glossy black MDF aprons with decorative cherry appliqués forming a horizontal grid pattern on the aprons. A cherry plywood bartop sits atop a 2 × 6 L-shaped kneewall, harboring some practical amenities on the bartender side. A flip-up lift gate in the bartop on one end provides pass-through access and can even function as a wait station if you want to get really fancy in your hosting

The key components—base cabinets, a laminate countertop, the fridge, and the wood for a sleek Asian-inspired style trim-out—set the stage for your next gathering. Let's party.





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Tools

Miter saw
Table saw
Circular saw
Drill/driver
Level
Stud finder
Pull saw
Flat bar
Pneumatic nailer/compressor
Combination square

Materials

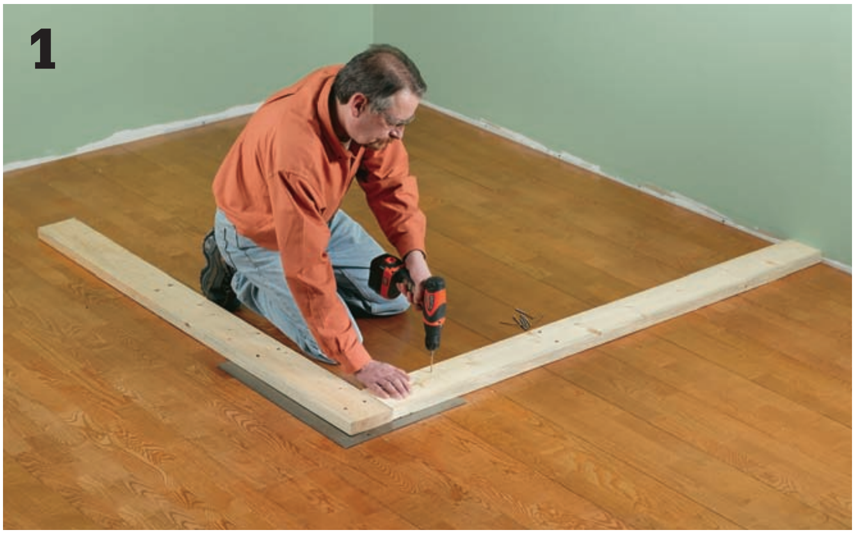
(10) 2 × 6" × 8 ft. SPF
(1) ¾ × 4 × 8 cherry plywood for bartop
(1) ¾ × 4 × 8 particleboard
(2) 6 ft. strips ½ × 16" cement board
20 sq. ft. 4 × 4 wall tile
Thinset and grout
¾" thick cherry- 2 @8 × 42" (actual)
¾ × 1½" cherry approx 80 lineal ft.
(2) ½" × 4 × 8 ft. MDF
36" base cabinet- corner (12" wide doors)
24" base cabinet
Refrigerator (19w 22d 32-¾" h)
Postform countertop (mitered, 6 ft. each leg)
16d common nails
Panel adhesive
1½" wallboard screws
Finish nails (4d, 6d)
Finishing materials
Glue
Piano hinge

Cutting List

Part	No.	Desc.	Size	Material
A	4	Sill/header	1½ × 5½ × 68"	2 × 6
B	11	Stud	1½ × 5½ × 38"	2 × 6
C	2	Bartop	¾ × 16½ × 80"	Cherry plywood
D	1	Bar substrate	¾ × 16½ × 80"	Particleboard
E	1	Bar substrate	¾ × 16½ × 65¼"	Particleboard
F	2	Lift gate	¾ × 16½ × 22¼"	Cherry plywood
G	-	Bartop trim	¾ × 1½" × cut to fit	Cherry
H	2	End cap	¾ × 7¾ × 41"	Cherry
I	7	Trim stiles	¾ × 1½ × 41"	Cherry
J	16	Trim rails	¾ × 1½ × cut to fit	Cherry
K	1	Countertop cleat	1½ × 1½ × 22"	2 × 2
L	1	Lift gate stop block	¾ × 1½ × 18"	Cherry
M	1	Apron	½ × 40½ × 68¾"	MDF
N	1	Apron	½ × 40½ × 68¾"	MDF

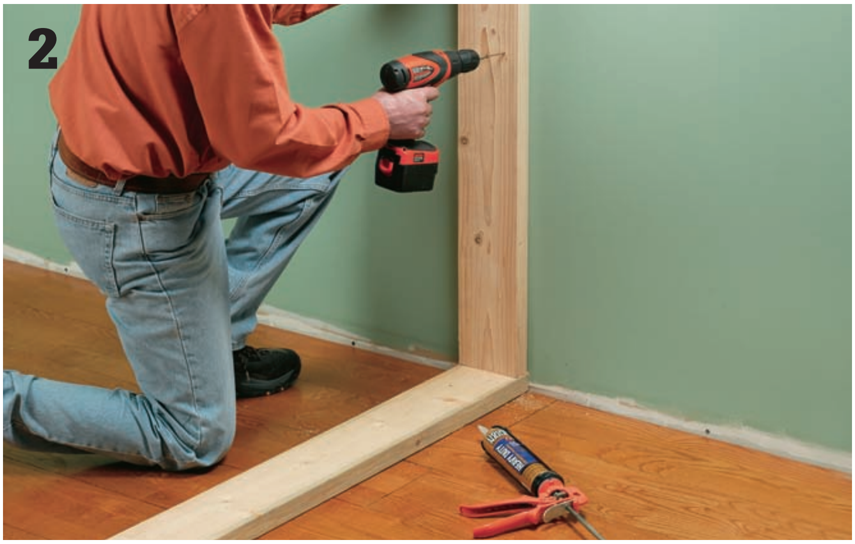
How to Build a Club Bar

1



Anchor the sill plates for the kneewalls to the floor so they form a right angle at the corner where they meet.

2



Use panel adhesive and deck screws to attach the end kneewall stud to the back wall, attaching at a stud location wherever possible.

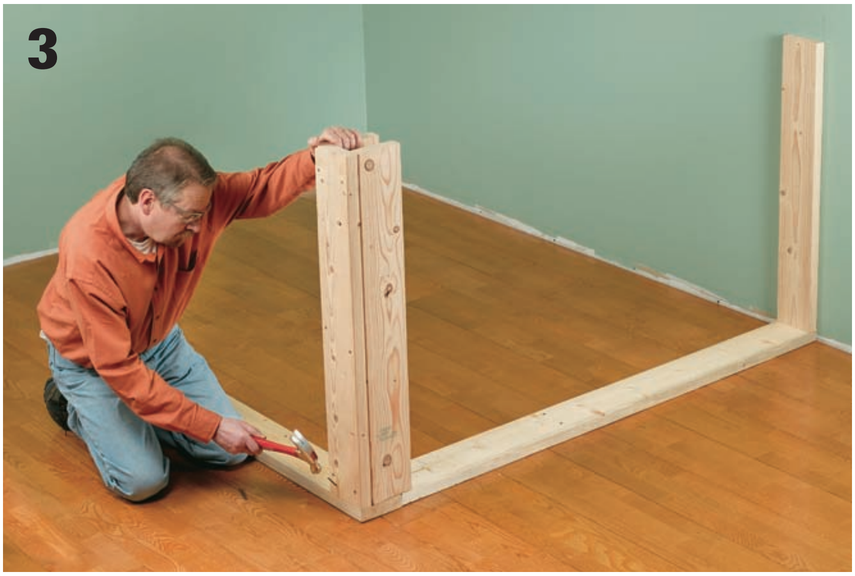
BUILD THE KNEEWALLS

The bar top is supported by a pair of heavy-duty 2 × 6 kneewalls that are anchored to the wall and floor and meet in an L. This configuration presumes that you'll be installing the bar in the corner of the room. If that configuration doesn't work for your space, you can use similar building strategies, but redesign the project as a straight-line or a U-shape bar.

Cut the 2 × 6 sill plates to length (68"). Measure out from the corner the distance of the sill plates plus the pass-through opening width plus ¾" for the thickness of the end panel (92¾" here). Mark a reference line and lay a sill plate at this distance, perpendicular to the back project wall. Arrange the second sill plate so the end overlaps the open end of the first sill plate and the two form a perfect 90 degree angle. Join the corners with screws or a metal connector to keep them from moving during installation, and then anchor the sill plates to the floor. Use 16d common nails or screws (shown in photo 1) and panel adhesive for a wood floor; use a powder-actuated nailer on a concrete floor (photo 1).

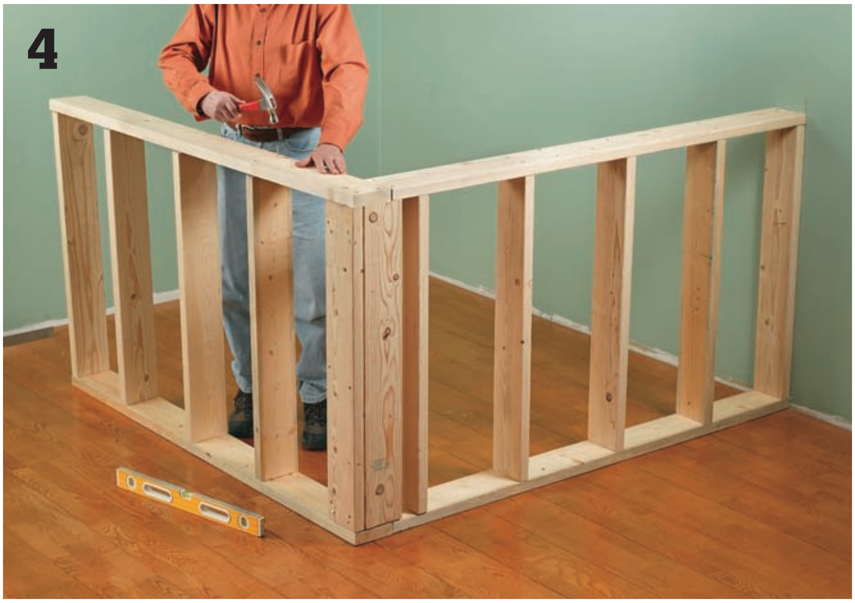
Once the sills are in place, attach the end stud against the back wall. If you are lucky (or planned well) the stud will fall over a wall stud. If the new kneewall must fall over a stud bay in the room wall, you'll need to remove some wallcovering and install a nailing cleat between the closest wall studs so you have a very sturdy surface to anchor the end of the wall (photo 2).

3



Toe-nail the corner studs to the sill plates as shown in the diagram on page 170. Use a level to make sure the studs are vertical.

4



Complete the framing for the L-shaped kneewall section. For extra strength, drive a few 3" deck screws through the studs where they meet at the corner.

Next, make the stud wall corner, following the diagram on page 170. Use 16d common nails to toe-nail the studs to the sill plates (photo 3). Install a stud at the free end of the return, then fill in with evenly spaced intermediate studs spaced no more than 16" apart. Cut cap plates the same size as the sill plates and install them with panel adhesive and three 16d common nails driven through the tops of the caps and into the end of each wall stud (photo 4). Check each stud with a level before nailing.

MAKE THE APRONS AND TRIM

The decorative front aprons for this bar are made from ½"-thick MDF (medium-density fiberboard) panels that have a glossy black finish and are trimmed with strips of cherry arranged in a staggered ladder pattern. If you're feeling ambitious, apply a genuine black lacquer finish. Or, you can come close to the black lacquer look with a quality satin or gloss jet black enamel paint. Either way, for the smoothest possible finish, cut and prepare the panels and spray on the black lacquer finish with an HVLP sprayer.

Rip two sheets of ½" MDF to 42" wide and then trim them to length to make the bar front panels. Sand the edges to remove any saw marks. Then, apply primer to all faces and edges. When the primer dries, spray black lacquer or paint onto the front face and edges (photo 5). If you do not have access to a good sprayer, use a paint roller with a short-nap sleeve.

After installation, the black aprons will be decorated with a grid made from strips of cherry. You can use dimensional 1 × 2 cherry for this, but you'll save a lot of money and get better edges if you purchase random width cherry, then plane and joint it to thickness and rip it to width (photo 6). For the project shown here, you'll need at least 40 lineal feet of stock for the apron trim, plus another 40 ft. for the bar countertop edging.

Sand the edges of the cherry trim to remove saw marks and smooth the surfaces. Apply a clear protective wood finish, such as wipe-on polyurethane varnish, to half the stock for use as apron trim (photo 7). The other half of the stock will be used for edging the countertop. You'll need to cut an edge profile in this stock and attach it to the countertop before finishing it.

INSTALL THE KNEEWALL COVERINGS

The front faces of the L-shaped kneewall are covered with the aprons and apron trim. The back sides (the bartender view) can be covered with just about anything you wish. We used a cement board backer and some wall tile for a nice looking wall covering that's durable and easy to clean. It's easier to install these wallcoverings before the bartop has been installed.

5

For the smoothest possible finish, spray the front apron panels with an HVLP sprayer. Apply the paint or lacquer over primer, in thin coats.

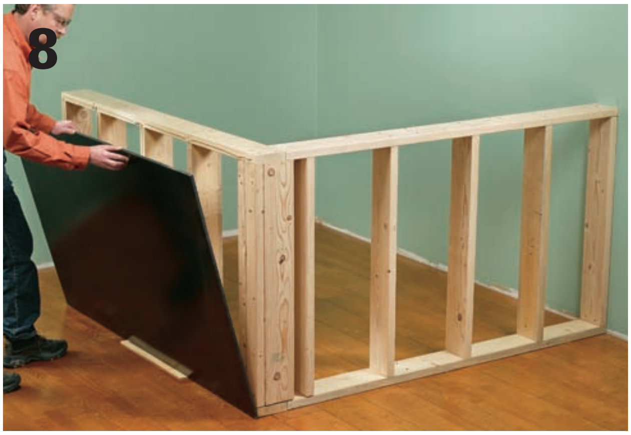
6

Prepare at least 80 lineal feet of ¾ × 1½" hardwood stock to trim out the aprons and edges of the bartop.

7

For efficiency, apply a protective finish to the cherry apron trim stock. Dab some finish on the cut ends after you cut each trim piece to length.

8



Apply panel adhesive to the kneewall studs to strengthen the bond with the black aprons. Slip a ¼-thick spacer beneath each apron to create a gap between the panel and the floor.

9

Nail the apron panels to the wall studs at 8" to 12" intervals.

10

DURO
Cement Board

Attach cement board strips to the edges of the kneewall framing members as a backer for the backsplash area.

11

Install the inside wallcovering before you cap the wall.

You don't need to create full toe-kick recesses at the bottoms of the apron panels, although you certainly can if you wish. But it is a good idea to install the MDF aprons so they are not in contact with the floor, especially if your installation is going into a basement or any other area that may be subject to moisture problems. The easiest way to do this is simply to cut a piece of ¼"-thick sheet stock scrap and slip it up against the sill plate. Then, test the fit of the apron panels. Trim if needed, then apply beads of panel adhesive to the front edges of the wall frame members (photo 8) and attach the aprons with a pneumatic nailer and 2½" finish nails (photo 9). You can hand-nail them at wall stud locations with 6d finish nails if you prefer. Cover nail heads with wood putty.

Depending on what type of cabinets you're installing, it likely is not necessary to finish the inside faces of the kneewalls lower than the countertop height. For installing wall tile, we cut 16"-wide strips of ½"-thick cement board and attached them to the wall studs flush with the top of the cap plate (photo 10). Make sure that seams fall over studs.

Install the wall tile (photo 11). We used inexpensive 4 × 4" ceramic wall tile set into a layer of thinset adhesive that's troweled onto the cement board. Whichever wall covering you use, it should extend down past the top of the countertop (in this case, the top of the preformed backsplash), and the edges should be covered by the end panel you'll be installing at the free end of the kneewall.

12

Bond the particleboard subbase directly to the top plates of the kneewalls, taking care to achieve even overhangs of 6" in front and 4" on the bartender side of the walls.

13

Drive plenty of 2" deck screws to secure the subbase to the walls. The screw heads must be sunk beneath the wood surface.

14

Make 45-degree miter cuts in the bartop top layer using a circular saw and cutting guide.

INSTALL THE BARTOP

The bartop installed here is made of a particleboard subbase that's thoroughly bonded and screwed to the top plates of the kneewall. A cherry plywood top layer then is attached to the narrow particleboard subbase. The subbase is laid out with a butt joint at the corner for ease and for strength, but for a more refined appearance the plywood top is mitered at the corner. When ¾"-thick cherry edging is added on all sides, the bartop grows to a finished width of 18" (a normal countertop, such as the bartender's countertop on the cabinets below, is 25" wide).

Rip the particleboard to 16½" wide and then crosscut it to length (one piece is longer so they can be butted together). Attach the strips to the top plates of the kneewalls using panel adhesive and countersunk deck screws (photo 12). Make sure to align the subbase strips carefully. They should overhang the kneewalls by roughly 6" in front and 4" in back.

Once you have both subbase parts arranged perfectly, drive 2" deck screws through the subbase and into the bar wall (photo 13). Be very generous here. If you can't get the screw heads to seat beneath the surface of the subbase, drill countersunk pilot holes.

Cut the cherry plywood sheet into 16½" wide strips, then cut mating miter joints at the ends (photo 14). Take care here: most hardwood plywood has one side that is much nicer, so be sure the cuts are made so the correct faces will be facing up when the bartop is installed. A circular saw with a sharp panel-cutting blade and a straightedge guide may be used to make these cuts.

Attach the top layer of cherry plywood to the subbase with panel adhesive and 1¼" wallboard screws driven up through the subbase and into the underside of the plywood layer (photo 15). Make sure the mitered corner fits together correctly before applying any adhesive or cutting the plywood strips to length (Tip: Wait until the plywood layer is attached to the subbase to cut the strip on the free end to length. That way, you can cut it and the subbase at the same time and ensure that they are exactly flush).

Check to make sure the edges of the glued-up bartop are smooth and flat, and sand with a belt sander if they are out of alignment or there is a lot of glue squeeze-out (use fine grit sandpaper to help prevent any splintering of the veneer layer). Mount a ½" to ¾" roundover bit in a router or router table and cut roundover profiles along one edge of the 1 × 2 stock you dressed to use for bartop edging.

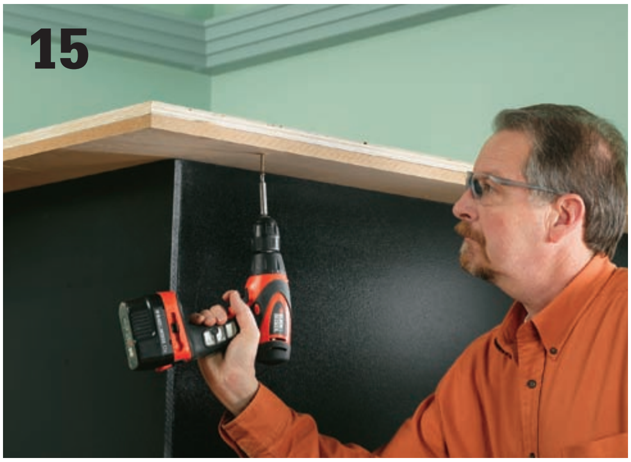
Attach the edging strips to the countertop with glue, 4d finish nails driven into pilot holes, and plenty of pipe clamps or bar clamps (photo 16). Make sure the tops of the edging boards are flush with or slightly higher than the plywood surface. If necessary, sand the edging until it is flush after you remove the clamps. At the open countertop end, extend the edging ¾" past the end of the glued-up layers.

Cut a piece of 1 × 2 edging to fit between the ends of the edging on the open end of the countertop and attach it with glue and finish nails (photo 17). Sand all wood surfaces. Apply multiple coats of very durable, glossy polyurethane varnish to achieve a protective built-up finish. Also paint the underside of the bartop black where it is visible. Build the lift gate section of the countertop as well and finish it the same way, except make it from two layers of cherry plywood and apply a clear finish to both faces.

INSTALL TRIM AND HARDWARE

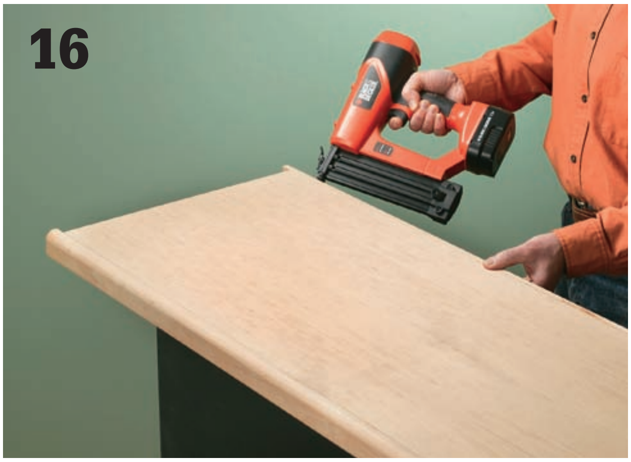
Rip-cut a strip of cherry that's slightly wider than the distance from the tiled wall surface to ¾" past the apron fronts (about 8") and then cut it to fit between the floor and the underside of the bartop, which should overhang the end wall stud by ¾" or slightly more (photo 18). Cut another identical strip. Attach one strip to the end of the kneewall and attach the other to the wall on the opposite side of the pass-through so the two strips are perfectly aligned.

15



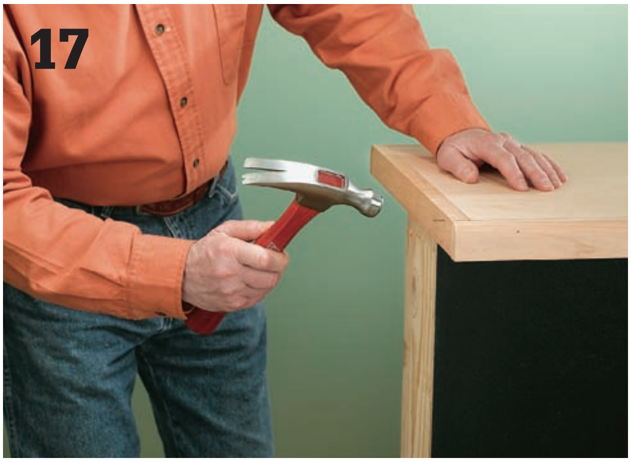
Laminate the top layer of cherry plywood to the subbase with panel adhesives and 1¼" screws driven up through the subbase.

16



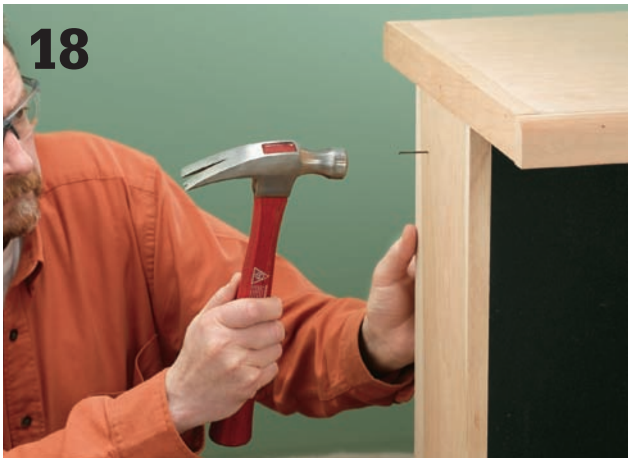
Cut a roundover profile in one edge of the cherry edging stock and then cut the parts to length and attach them to the edges of the bartop with nails, glue and clamps.

17

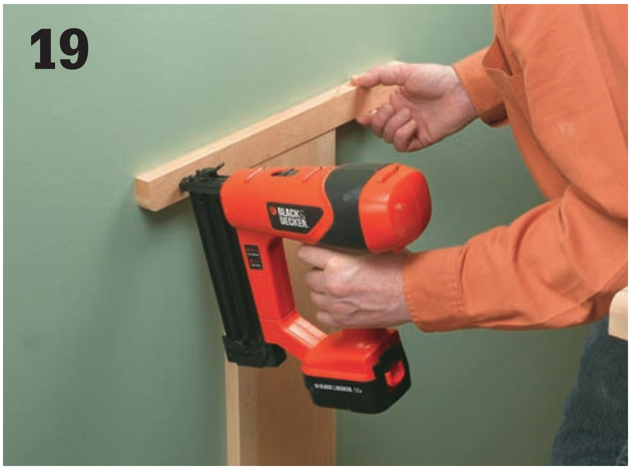


Square-cut a piece of 1 × 2 edging to fit exactly between the ends of the roundover edging, and nail and glue it into place.

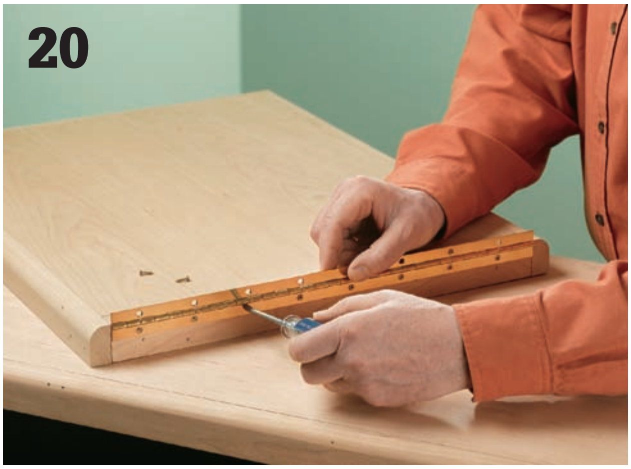
18



Nail the cherry end panel to the wall end to conceal the stud wall and the edges of the wallcoverings and trim.



Attach a 1 × 2 stop block for the lift gate to the wall directly above the wall-mounted end panel.



Attach the piano hinge to the lift gate section of countertop first, then attach the other leaf to the countertop.

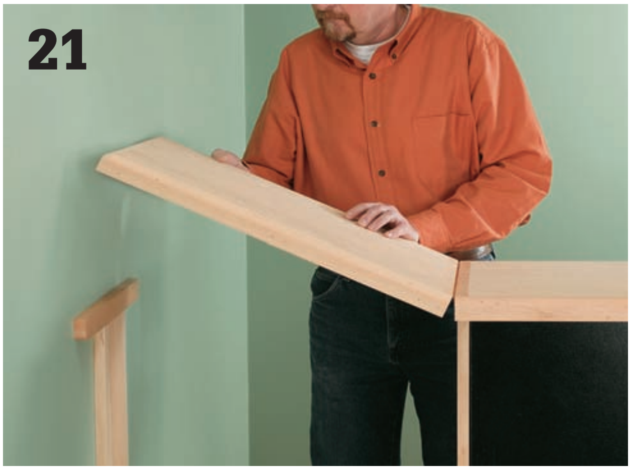
Cut a strip of 1 × 2 cherry to 18" long and attach it to the wall, centered over the 8"-wide end panel (photo 19). This strip will function as the stop for the lift gate section of countertop. For consistency, roundover the top edges of the 1 × 2 so it looks like a section of countertop.

Attach a piano hinge to the square-cut mating edge of the lift gate countertop section (photo 20). The barrel of the piano hinge should be oriented upward relative to the bartop surface. Attach the other leaf of the piano hinge to the edge of the main countertop and test to see if it opens and closes easily and is level when open (photo 21).

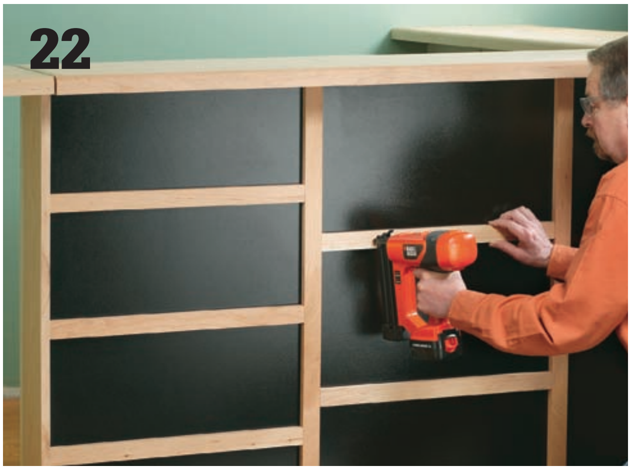
Cut the cherry trim pieces to size to make the ladder grids that decorate the aprons. Install the strips, following the patterns shown on page 170 (photo 22). Make sure the ends of the strips are tucked flush against the inside face of the cherry end panel.

INSTALL THE CABINETS

You can appoint the bartender's area of the Club Bar just about any way you wish because the bartop and wall are freestanding, independent structures. We chose to install a couple of base cabinets, a dorm-size refrigerator and an economical, low-maintenance postform countertop. Start by placing the corner cabinet in the corner. Place the 24" cabinet to the right of the corner cabinet. Flush up the face frames (if they have them; the ones seen here are frameless) and clamp the cabinets together with bar clamps. Pre-drill, countersink, and screw the face frames or cabinets sides together (see pages 62 to 77 for more information on installing countertops).

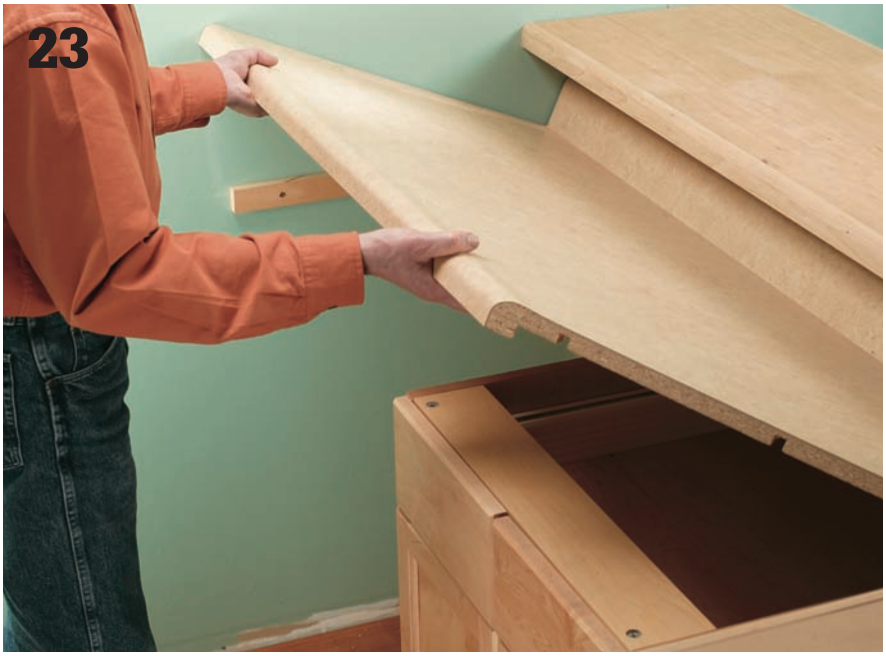


Attach the lift gate to the countertop and test to make sure it operates smoothly and correctly.



Add the decorative cherry strips in a ladder grid pattern, using an air nailer. Start with the vertical strips, then cut the horizontals to fit.

23



Attach a countertop to the base cabinets to create an easy-to-clean work surface for the bartender.

24

Slide in a refrigerator, keg-o-rator or any appliance you choose.

Install a countertop for the bartender (photo 23). We chose an inexpensive postform countertop with a pre-cut mitered corner. If you've left one end of the bar open for a refrigerator, install a wall cleat to support the countertop above the refrigerator. Plug in and slide in your refrigerator (photo 24), add a couple of strands of holiday lights or any other décor you fancy.

PARTY TIME

Invite friends and family to gather 'round. As they say in Latin: Res Ipso Loquitor: "The Thing Speaks For Itself." Or, as one of my friends might say: "It's beer-thirty."

SHELVING PROJECTS

Shelving Basics

When making shelves for your floor-to-ceiling shelves or utility shelves, choose shelving materials appropriate for the loads they must support. Thin glass shelves or particleboard can easily support light loads, such as decorative glassware, but only the sturdiest shelves can hold a large television set or heavy reference books without bending or breaking.

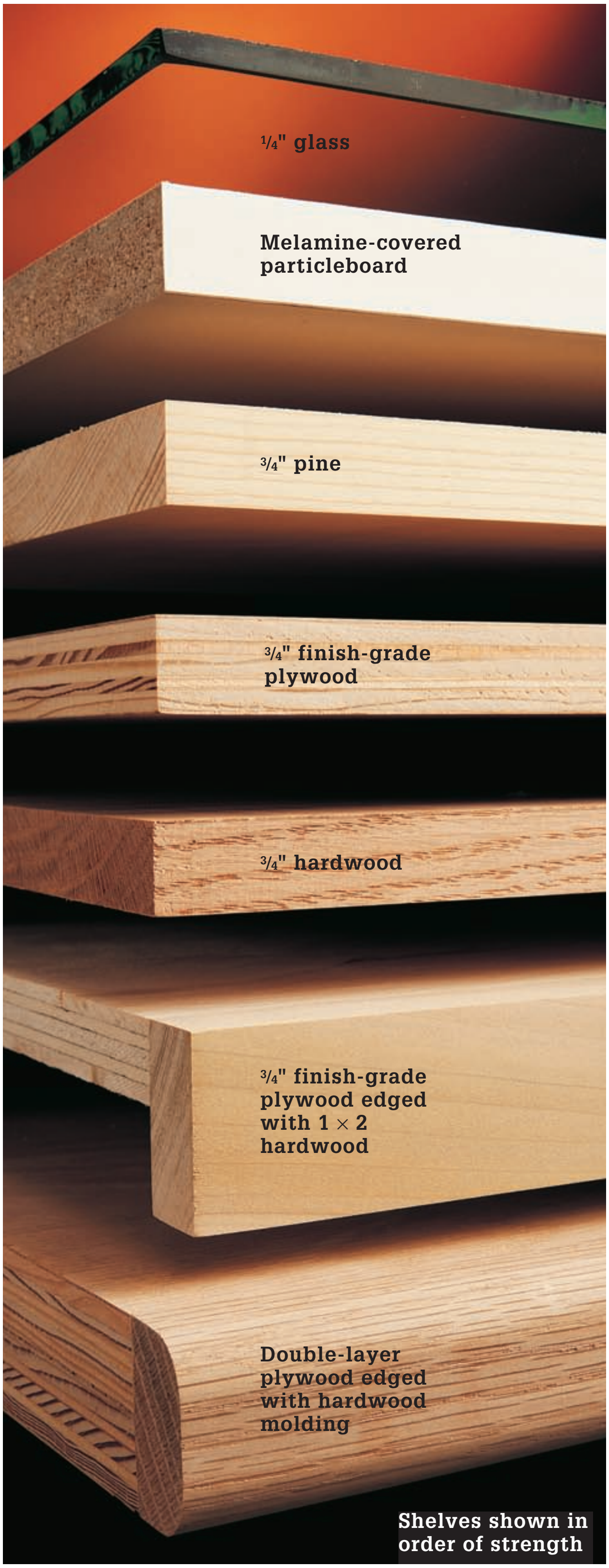
The strength of a shelf depends on its span—the distance between vertical risers. In general, the span should be no more than 36" long.

Building your own shelves from finish-grade plywood edged with hardwood strips is a good choice for most carpentry projects. Edged plywood shelves are strong, attractive, and much less expensive than solid hardwood shelves.

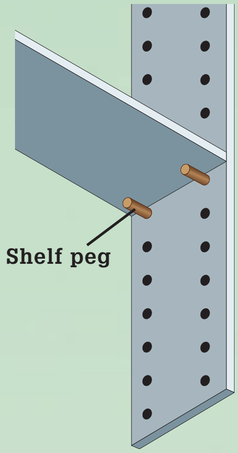
Tools & Materials ▸

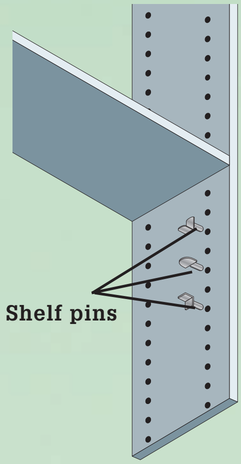
- Right-angle drill guide
- Drill with bits
- Marking gauge
- Router
- Hammer
- Nail set
- Shelving material
- Scrap pegboard
- Pin-style shelf supports
- Metal shelf standards
- Shelf clips
- Finish nails

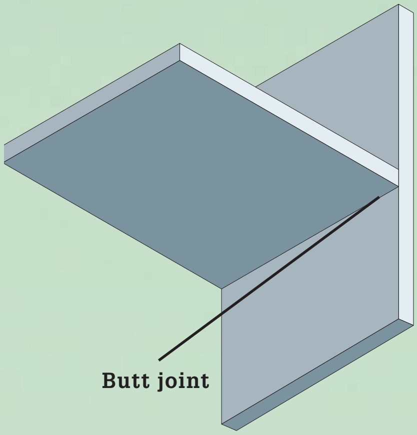
Attach hardwood edging or moldings to the front face of plywood shelves, using wood glue and finish nails. Position the edging so the top is slightly above the plywood surface, then drill pilot holes and drive finish nails. Use a nail set to countersink the nail heads. Sand the edging so it is smooth with the plywood surface before you finish the shelf. For greater strength, edge plywood shelves with 1 × 2 or 1 × 3 hardwood boards.

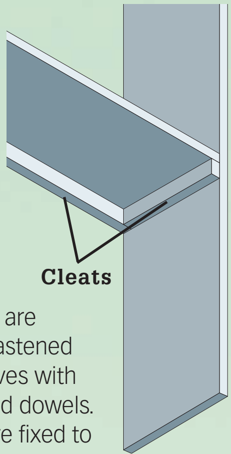

1/4" glass
Melamine-covered particleboard
3/4" pine
3/4" finish-grade plywood
3/4" hardwood
3/4" finish-grade plywood edged with 1 × 2 hardwood
Double-layer plywood edged with hardwood molding

Shelves shown in order of strength

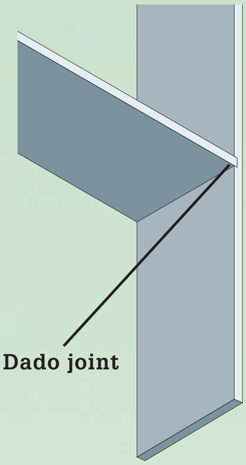


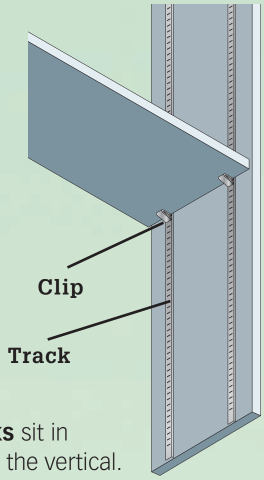




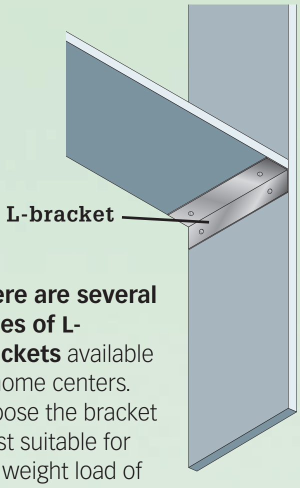


Cleats are often fastened to shelves with glue and dowels. They are fixed to verticals and the wall with screws.

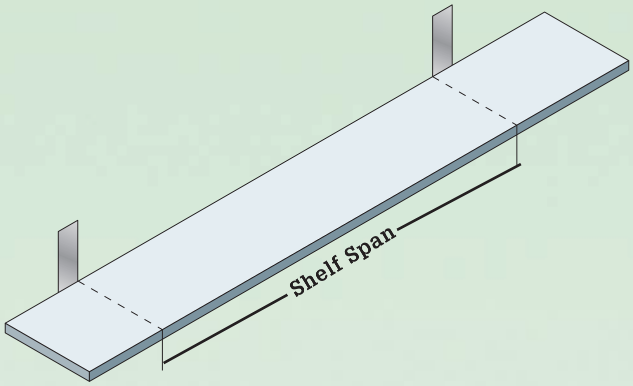




The tracks sit in grooves in the vertical.



There are several types of L-brackets available at home centers. Choose the bracket most suitable for the weight load of shelving.



Shelf span is the distance between risers. A shorter span strengthens a shelf.

Modular Shelving

Shelving is not a one-size-fits-all proposition. Your beer can collection has entirely different shelving needs from your Encyclopedia Brittanica volumes, which in turn have equally different demands from your paperback novels. The beauty of making your own shelving is that you can easily customize both the size and the support mechanism to your needs. One good way to customize shelving is to make modular shelves with adjustable supports.

While display shelves can be as narrow as a couple of inches, typical storage shelves range between 11" (bookcases) and 24" (closet or cabinet depth). In this section you'll learn how to make and finish custom shelves to any width you choose.

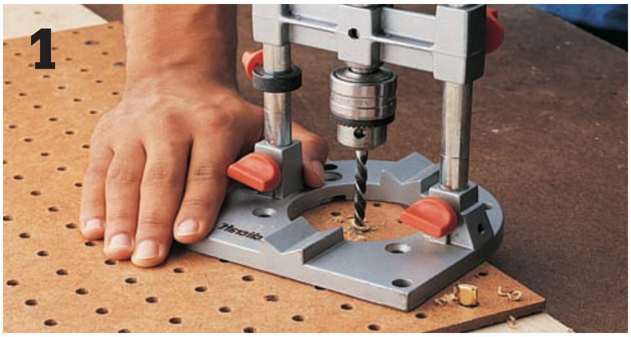
Great for closets and utility storage, modular shelves are supported by adjustable pins or brackets so you can easily increase or decrease the space between shelves to meet your storage needs.

Tips for Making Shelves ▸

Rip-cut shelves to the exact width you need from sheet stock. Quality plywood offers the most strength, but for ease of cleaning you'll appreciate melamine-coated particleboard.

Heat-activated veneer edge tape can be applied to the edges of plywood or particleboard shelves for a more finished appearance.

How to Install Pin-style Supports for Adjustable Shelves



Mount a drill and ¼" bit in a right-angle drill guide, with the drill-stop set for ⅜" cutting depth. Align a pegboard scrap along the inside face of each shelf standard, exactly flush with the end, to use as a template. Drill two rows of parallel holes in each riser, about 1½" from the edges of riser, using the pegboard holes as a guide.

When the bookcase or built-in is completed, build shelves that are ¼" shorter than the distance between standards. To mount each shelf, insert a pair of ¼" pin-style shelf supports in each riser.

How to Install Metal Standards for Adjustable Shelves

Mark two parallel dado grooves on the inside face of each standard, using a marking gauge. Grooves should be at least 1" from the edges.

Cut dadoes to depth and thickness of metal tracks, using a router. Test-fit tracks to make sure they fit, then remove them.

After finishing the built-in, cut metal tracks to length to fit into dadoes and attach them using nails or screws provided by the manufacturer. Make sure slots in tracks are aligned properly so shelves will be level.

Make shelves so they are ⅛" shorter than the distance between standards, then insert shelf clips into the slots in the metal tracks, and install shelves.

Installing Wire Shelving

Wire shelving provides a quick and easy solution to a cluttered closet. It lacks adjustability but is nevertheless an inexpensive option to help organize your closet. Basic wire shelving is attached to walls with support brackets. For entire wall lengths we recommend finding a system that also has return wall brackets (often called "side wall brackets") and support clips. Both drywall shelf clips and stud shelf clips are available at home centers. Support brackets placed at stud locations further stabilize the unit.

A slightly advanced style of wire shelving that is increasing in popularity is track-mounted. It is available in more styles than standard white vinyl-coated wire shelving. This type of wire shelving consists of a horizontal rail track that supports vertical rails, or the vertical may be directly fastened to the wall. Shelf brackets then snap into the verticals and shelves are set on top of the shelf supports. These systems are viable closet organizers but cannot bear as much weight as wood or melamine systems. The span should be kept to 36" or less and have adequate support—by hitting studs where you can and using toggle bolts every 16".

Tools & Materials ▸

- Measuring tape
- Level
- Hacksaw
- Shelving system and hardware
- Drill

How to Install Wire Shelving

MEASURE WALLS AND MARK FOR SHELVING PLACEMENT

Measure the length of the back wall and the side walls. Measure up from the ground to the desired height for the top shelf and draw a level line on each side wall. *Note: The average minimum height above ground is 48".* Mark all stud locations along the back wall and side walls.

CUT WIRE SHELVING

Cut wire shelving to fit between walls, using a hacksaw. For shelving lengths greater than 8 ft., cut multiple shelves and connect them with the manufacturer's connectors (which are often sold at home centers that carry wire shelving).

ATTACH SIDE-WALL SUPPORTS

On a side wall, determine placement of the side-wall support according to manufacturer instructions. If instructions are not provided by the manufacturer, fit the support in place on the wire shelf and then, while holding the shelf in place along the level lines, mark the screw hole placements for the side-wall supports on the side walls.

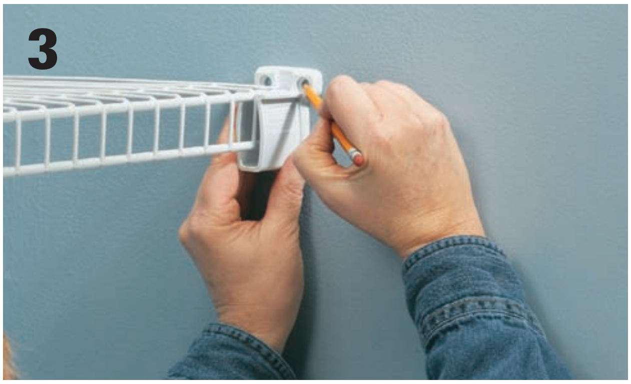
Predrill holes at the marked side-wall support locations. Hold a support in place and insert a toggle bolt through the support into the wall. Repeat with the other side-wall support. *Note: If you can hit a stud,*

1

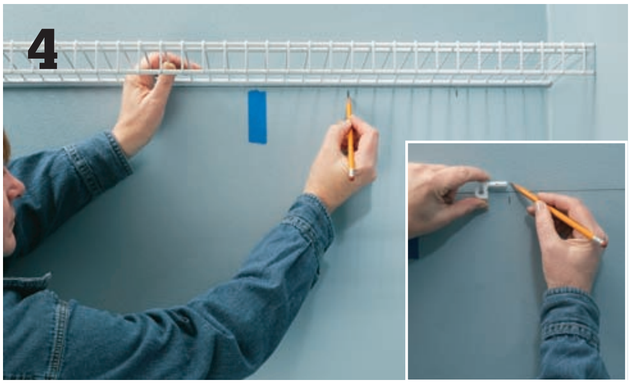
Measure your closet, and draw a level line 48" up from the floor.

2

Measure and mark the length of the shelving onto the wire. Cut the wire shelving to length, using a hacksaw.



Fit the side-wall bracket in place on the wire shelf and then, holding the shelf in place along the level line on back wall, mark the screw hole placements for the support on the side wall.



Mark the clip locations centered on spaces in the wire. (Inset) Mark actual clip-pin hole placement according to manufacturer instructions.

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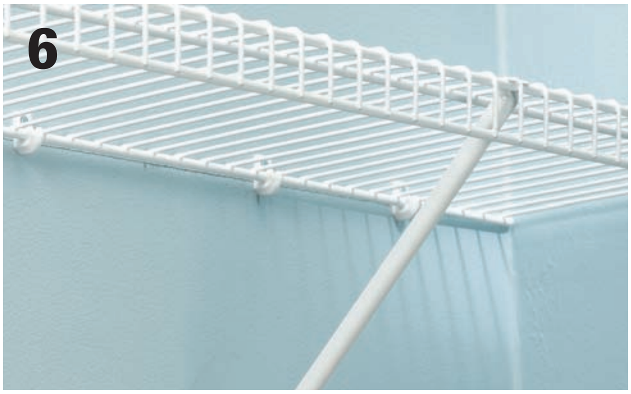
14.4v

Predrill holes for the wall clips to the size and depth recommended by the clip manufacturer.



Lower the wire shelving into place. Snap the support clips over the wire shelving.

a toggle bolt is not necessary; instead, use a standard 1½" drywall screw.

Place the wire shelving into the side-wall supports. Simply lower the shelving into place until it clicks into the supports. Have a helper hold the shelf so that the two side-wall brackets are not bearing the load of the shelf. Check for level.

MARK WALL FOR SUPPORT CLIPS

With wire shelving still fit into the side-wall supports, make a mark approximately every 6" along the wall. Space the marks evenly between studs.

Remove the wire shelving. Hold a clip at each mark, according to manufacturer instructions, and mark the pin-hole location. *Note: There is an offset from the level line on the wall that must be taken into account.*

INSERT THE SUPPORT CLIPS IN THE WALL

Predrill holes at the support clip marks on the back wall for the pin-hole placement. Insert the wall clips by pressing the manufacturer pin through the clip and into the wall. Use a hammer to tap stubborn pins into the wall. Lower wire shelving into the side-wall supports until they snap into place. Gently press the back of the shelving into the support clips.

ATTACH SUPPORT BRACKETS

Where possible, align support brackets at stud locations. Mark screw holes on wall. Determine where the other brackets will go on the wall for a uniform appearance. Space brackets approximately every 16" apart along the back wall.

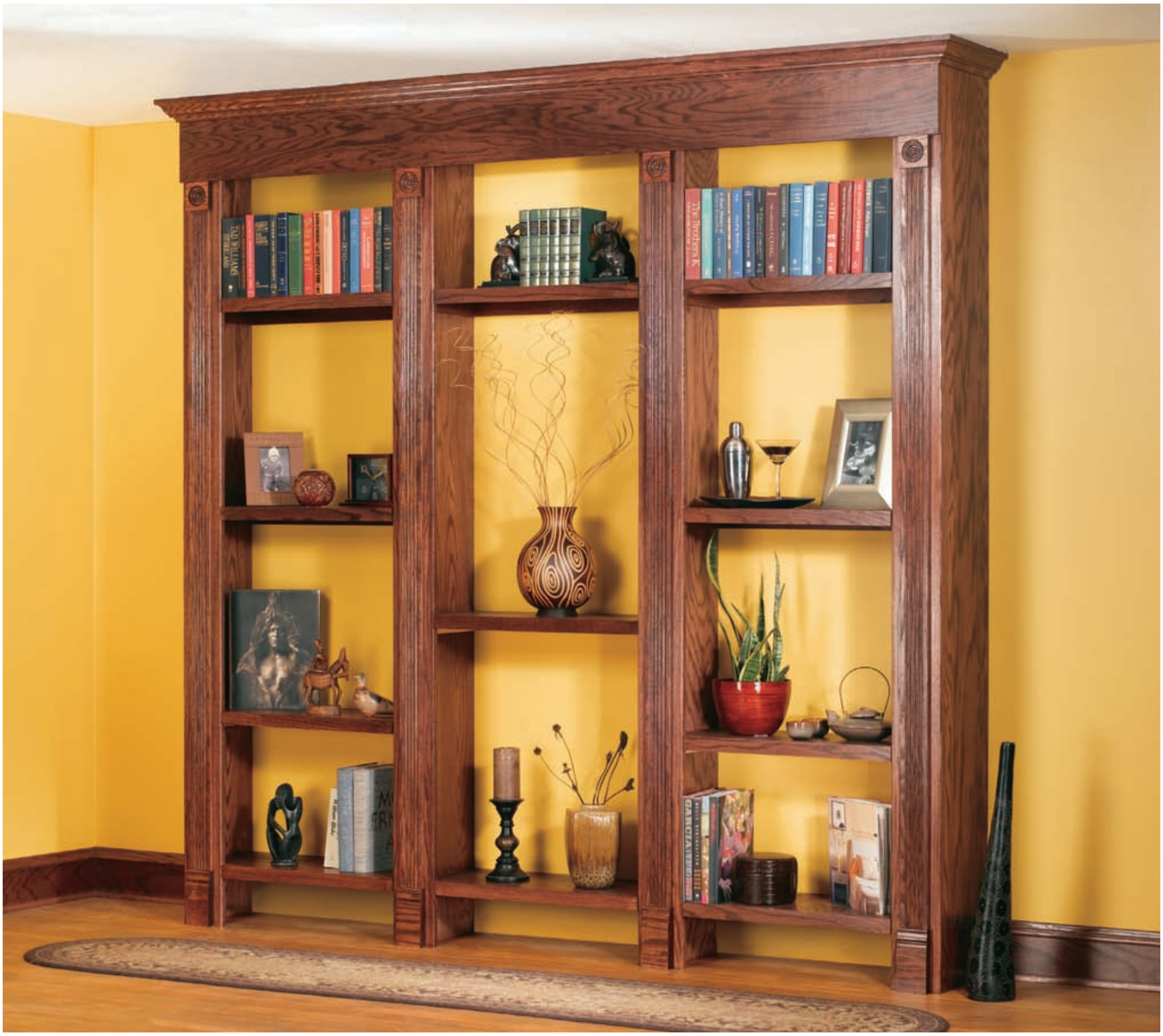
Attach wall brackets at stud marks, drilling screws through the bracket holes and into the anchors. For brackets that are not fastened to studs, use toggle bolts.

Fasten the other end of the brackets to the wire shelving according to the manufacturer instructions.

Formal Bookcase

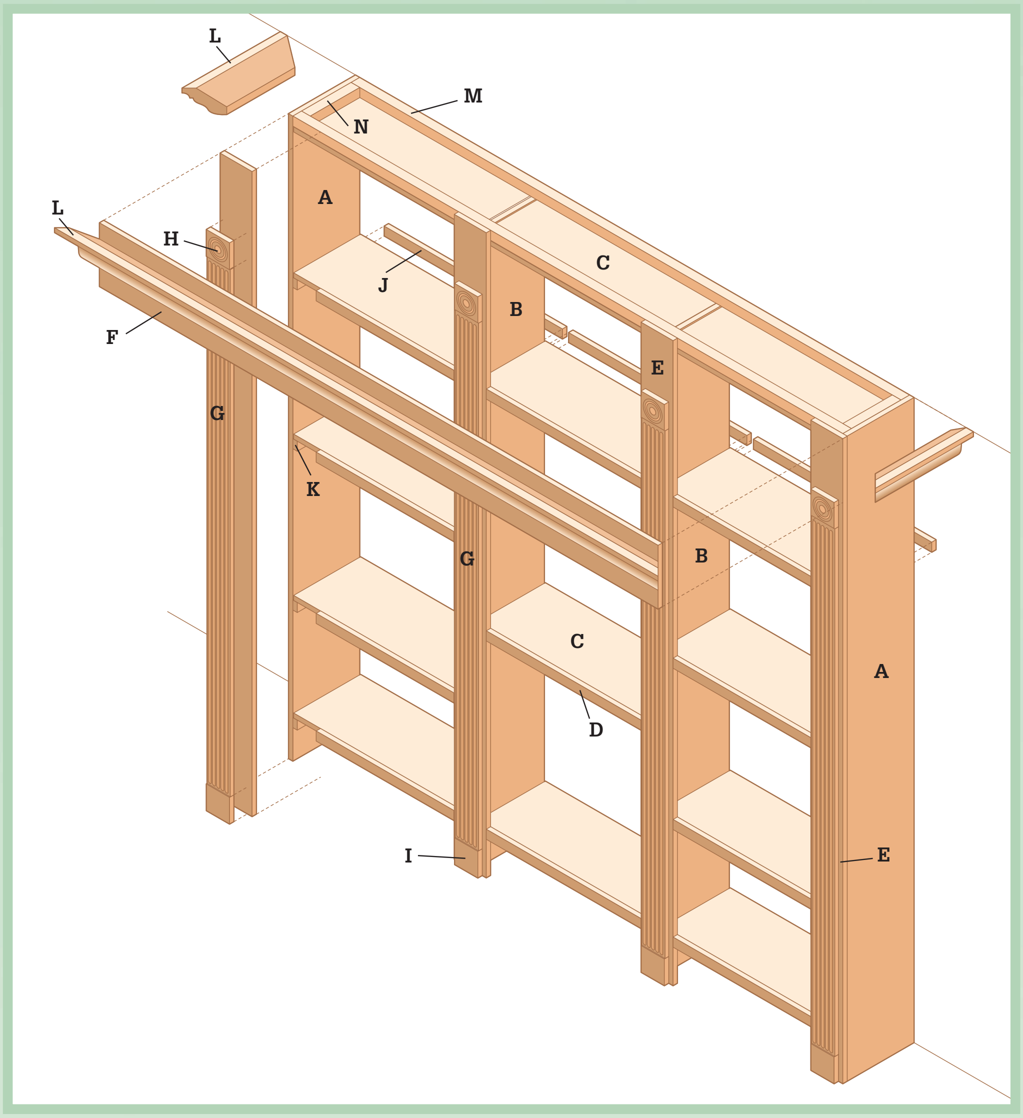
Few furnishings add prestige to a space like a formal floor-to-ceiling bookcase. Typically built from clear hardwood, the classically-designed bookcase delivers a refined, Old World feel. The bookcase shown here is made from red oak plywood and red oak 1× stock and moldings finished with a high gloss urethane. What's also nice about this piece is that it incorporates the wall behind it to balance all that clear hardwood with a splash of color and depth. This is a fixed-shelf design that enables you to build shelves anywhere you like to match your needs. And, because the shelf bays are built in a modular fashion, you can design it to any dimensions you wish.

The formal bookcase shown here is 8 ft. long, 8 ft. high and installed on a 12-ft. long wall. Because it's centered in the space, the moldings and sides return to the wall, creating niches on the left and right that are great for decoration. However, this bookcase can be built wall-to-wall if desired. It's a flexible design. Finally, the exact same style shelf can be built to take paint. Instead of using red oak, though, poplar is a great choice for a painted finish.



Tools

- Miter saw
- Table saw
- Circular saw
- Router
- Drill/driver
- Level
- Stud finder
- Pull saw
- Flat bar
- Step ladder or work platform
- Air nailer
- Combination square
- Drywall or deck screws
- Finish nails
- Glue
- Finishing materials



Materials

- (3) ¾ × 4 × 8 red oak plywood
- (16) 1 × 2 × 96 red oak plywood
- (4) 1 × 6 × 96 red oak plywood
- (1) 1 × 10 × 96 red oak plywood
- (4) ⅝ × 3⅜ × 84 oak plywood
- (4) Rosettes
- (4) Plinth Blocks
- 11 lineal ft. red oak crown molding
- (3) 2 × 2 × 96 pine

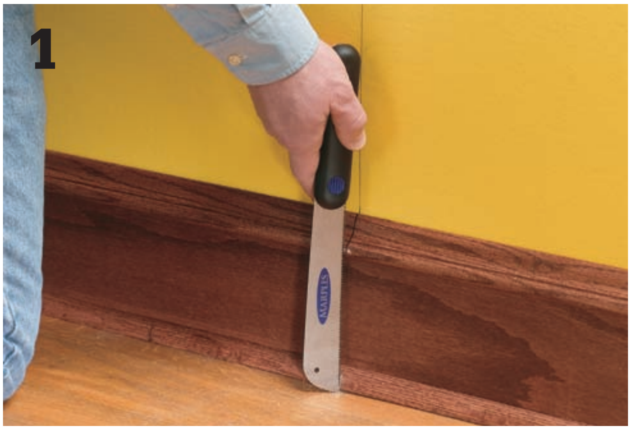
Cutting List

Part	No.	Desc.	Size	Material
A	2	Upright (outer)	¾ × 11½ × 96"	Red oak plywood
B	2	Upright (inner)	¾ × 11½ × 94½"	Red oak plywood
C	14	Shelf	¾ × 11½ × 31	Red oak plywood
D	11	Shelf nosing	¾ × 1½ × 31"	Red oak 1 × 2
E	4	Upright backer	¾ × 5½ × 96"	Red oak 1 × 6
F	1	Fascia	¾ × 9½ × 96"	Red oak 1 × 10
G	4	Fluted molding	⅝ × 3⅜ × 78½	Red oak molding

Part	No.	Desc.	Size	Material
H	4	Rosette	¾ × 4 × 4"	Red oak molding
I	4	Plinth block	¾ × 4 × 4"	Red oak molding
J	11	Shelf cleat (wall)	¾ × 1½ × 31"	Red oak
K	22	Shelf cleat (side)	¾ × 1½ × 10¾"	Red oak
L	3	Crown molding	½ × 3 3/16" × cut to fit	Red oak
M	2	Ceiling cleat (long)	1½ × 1½ × 94½	2 × 2
N	2	Ceiling cleat (short)	1½ × 1½ × 8½"	2 × 2

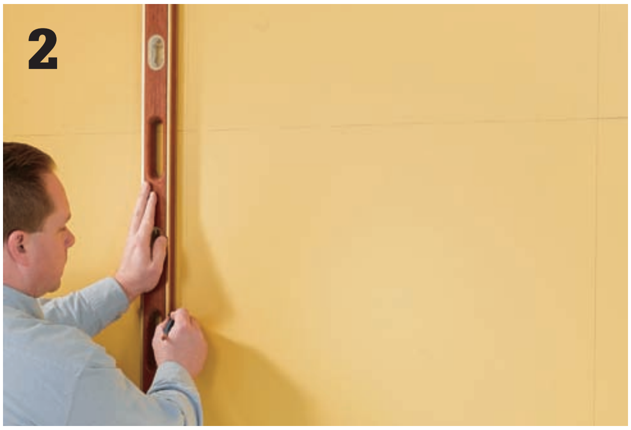
How to Build a Formal Bookcase

1



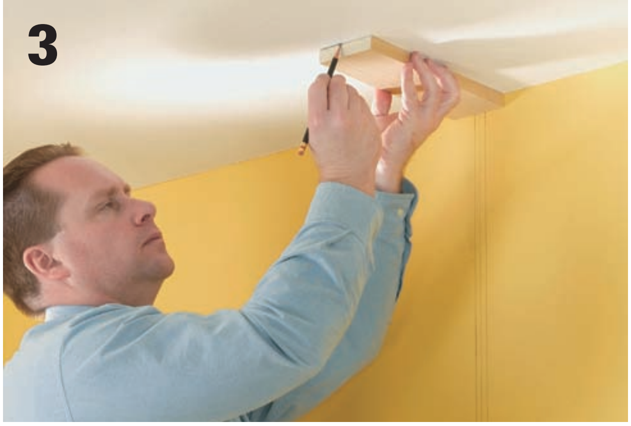
Cut through the base molding at the edges of the project area and remove it so the bookcase can fit tightly up against the wall.

2



Carefully mark out the plumb lines for the outside edges of the uprights and continue the mark up onto the ceiling.

3



Use a spacer as a gauge for marking the position of the front edge of the 2 × 2 nailing frame that is attached to the ceiling.

LAY OUT THE PROJECT ON YOUR WALL

This bookcase is designed to be stick-built at your installation site. The best place to begin is by drawing layout lines on the wall. The most important lines mark the locations of the four uprights, which need to be vertical and parallel, and for the shelf cleats that must be horizontal and parallel. Start by locating the centerline for the bookcase installation and marking it on the baseboard and on the wall. Measure out 4-ft. on each side of the centerline and make marks for the outside edges of the bookcase. These lines represent the outer faces of the left and right uprights. Using a pull saw (if you have one), cut and remove the baseboard between the left and right marks. Make your cuts as square as possible (photo 1).

Measure and make a mark 15⅜" on each side of the centerline, dividing the project area into three equal bays. On each side of all three vertical lines, mark out ⅜" to establish the locations of the ¾"-thick uprights.

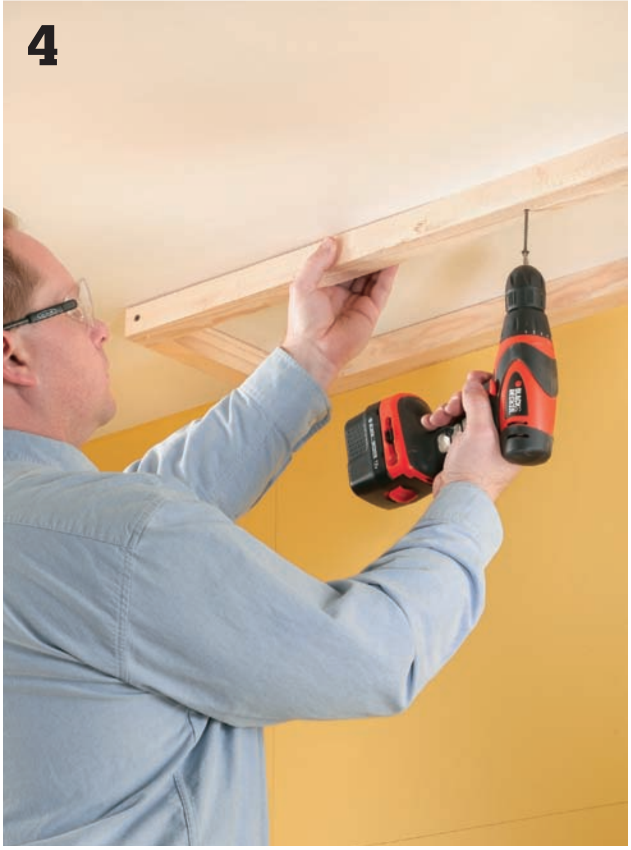
Measuring up from the floor, mark horizontal shelf cleat locations on the walls at the back of each bay. The cleats should stop at the upright locations so the ¾"-thick uprights can fit snugly in between the cleat ends. In the drawing, there is one bottom shelf, set 6½" off the floor in all three bays. The left and right bays have shelves 24", 48", and 72" up from the floor. The center bay has a single center shelf set at 36" off the top of the bottom shelf ledger and a top shelf at 72" (see Diagram, page 189). Using a 4-ft. level, mark horizontal reference lines for the shelf cleats in all three bays. Draw a small "X" below each line as a reminder of which side of the line to fasten the cleat. Then, use the 4-ft. level to extend the outlines for the uprights all the way up from the floor to the ceiling (photo 2). These sets of parallel lines should be ¾" apart and plumb.

At the ceiling, lay out the location for the 2 × 2 frame that creates nailing surfaces for the outer uprights and the 1 × 6 upright backers that are centered on the front edges of the uprights. The 2 × 2 frame should span from the inside faces of the outer uprights and extend 11½" out from the wall (photo 3).

Tip ▸

Make an 11½" wide spacer to use as a marking gauge.

4



Attach the 2 × 2 nailing frame to the ceiling at the layout lines, making sure to catch a ceiling joist where possible and using appropriate anchors in spots where no joist is present.

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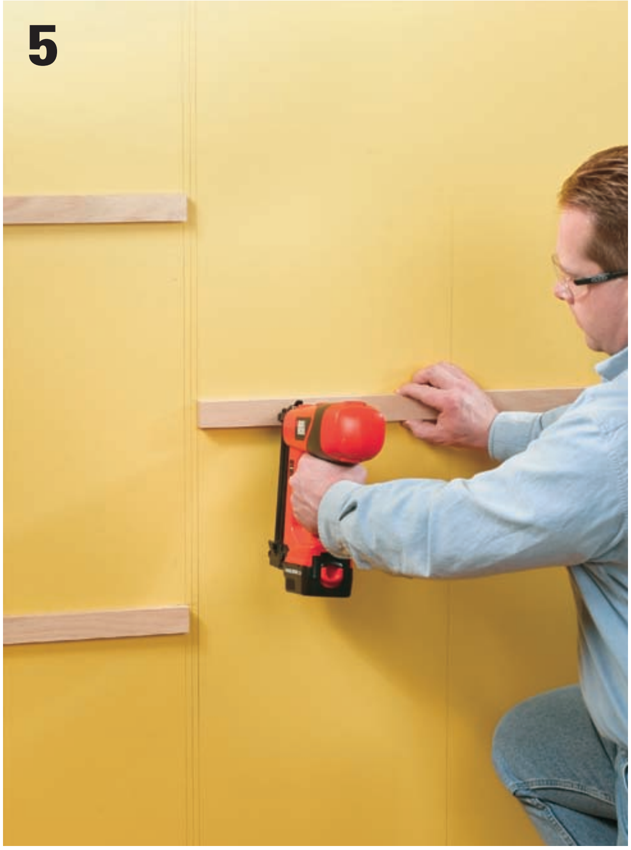


Attach all of the shelf cleats to the wall, making sure to preserve an even ¾" gap between cleat ends to make room for the inner uprights.

If you're installing undercabinet lights such as puck lights, locate the center of each bay on the ceiling and mark them for lights. Get a qualified electrician to install the wiring, fixtures, and switches. If you're doing the work yourself, follow local building codes. Pull the wire through the drywall or plaster and pigtail (curl up) for fixture installation later.

INSTALL THE NAILING FRAME

For ease of installation, assemble the 2 × 2 nailing frame on the ground. Use 2½" pneumatic finish nails or wallboard screws to join the 2 × 2 frame components. Test to make sure the assembly is square. Attach the frame to the ceiling by screwing up through the members at ceiling joist locations (use an electronic stud finder to identify these). Attach the frame to the wall's top plate at the wall/ceiling joint (photo 4). If the ceiling joists are parallel to the wall, you may need to use toggle bolts or other wall anchors to secure the frame along the front edge.

ATTACH THE SHELF CLEATS TO THE WALL

While plenty of fasteners, including trim-head wood screws or 8d nails, may be dependably used to connect the 1 × 2 red oak shelf cleats to the walls at stud locations, a pneumatic or cordless finish nailer loaded with 2" nails is ideal for the task. It eliminates the need to pre-drill and countersink fasteners, as you would when driving screws or hand-nailing into hardwood. A pneumatic nailer also dispenses fasteners quickly and accurately, making it much easier when you're working alone. Cut and install the cleats at the layout lines. A few dabs of construction adhesive applied to the wall behind the cleats will add even more strength to the connection. Fasten the cleats so the upright returns can be installed around them (photo 5).

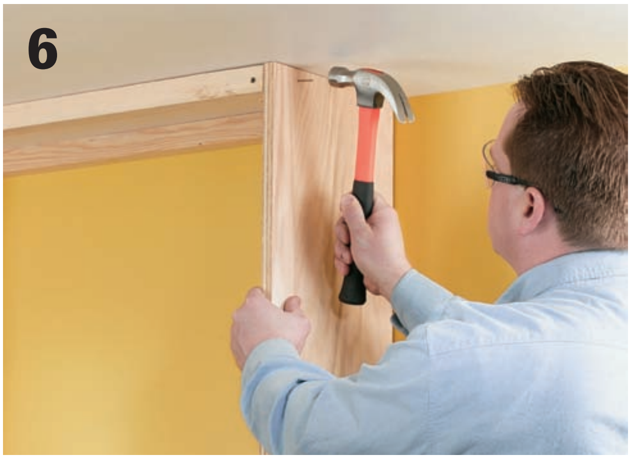
INSTALL THE UPRIGHTS

Cut the outer uprights (11½" wide) to full room height in length. Rest the bottoms on the floor and nail the top ends to the ends of the 2 × 2 nailing frame (photo 6). Also drive 8d finish nails through the uprights and into the ends of the shelf cleats in the outer bays (drill pilot holes first).

Rout a roundover, bead or chamfer onto each edge of the upright backer if desired (photo 7). Cut the inner uprights (11½" wide) to length. They should be 1½" shorter than the outer uprights because they butt up against the underside of the 2 × 2 nailing frame on the ceiling. Position the inner uprights between the ends of the shelf cleats that are attached to the wall in each bay. At the ceiling, use a framing square to make sure the inner uprights are perpendicular to the wall and then position a 1 × 6 upright backer over the upright edge. Center the backer on the upright edge and nail it to the 2 × 2 nailing frame. Double-check that the upright is perpendicular to the wall by measuring the bays at the wall and at the front of the upright and making sure the measurements are the same. Then drill pilot holes and drive 8d finish nails (or pneumatic nails) through the backer and into the edge of the upright at 12" intervals (photo 8). Install both inner uprights.

INSTALL THE SHELVES

The shelves and shelf cleats help stabilize the structure, so install them next. Start by nailing a shelf to the 2 × 2 ceiling frame at the top of each bay (photo 9).



Nail the outer uprights to the ends of the nailing frame attached to the ceiling.

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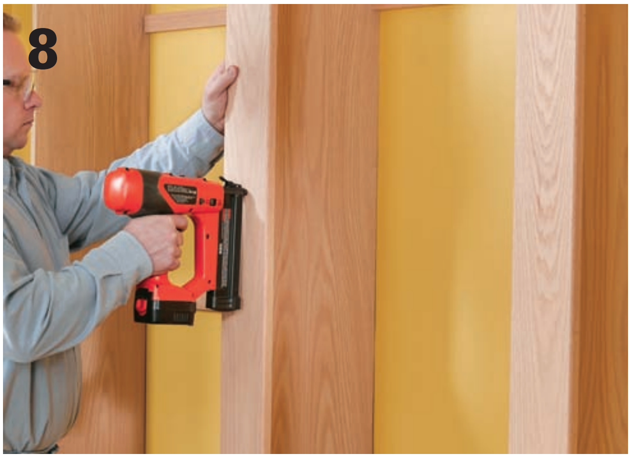
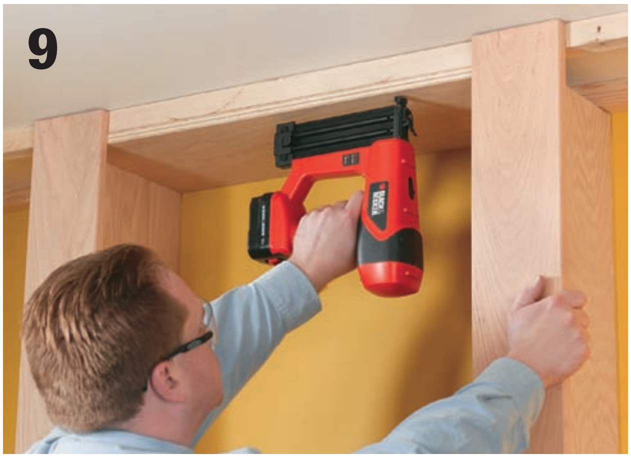
BLACK & DECKER

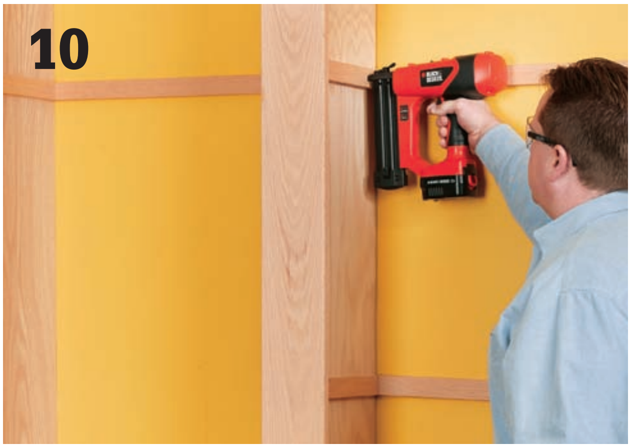
Routing a bead, round over, or chamfer adds nice detail and shadow lines to the upright backers.



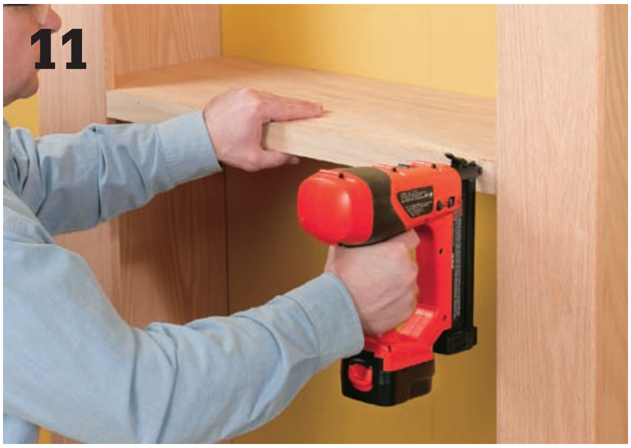
Attach the upright backers to the front edges of the inner uprights with pneumatic or hand-driven finish nails.



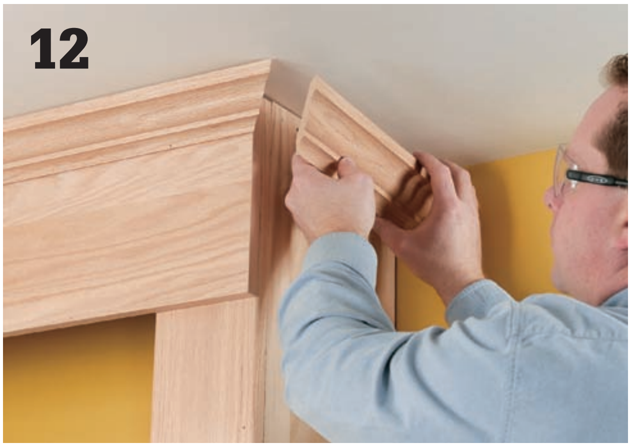
Attach a shelf board at the top of each bay to conceal the framework attached to the ceiling.



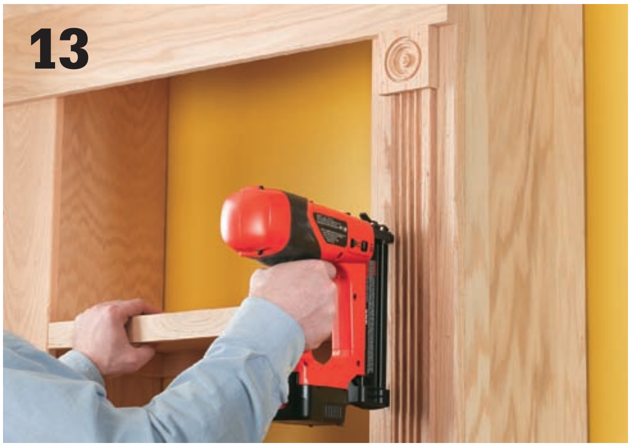
Attach the shelf cleats to the uprights, being careful to drive fasteners straight to prevent blow-outs in the upright returns.



Edge the red oak shelves with 1 × 2 red oak nosing that's bonded to the shelves with glue and finish nails.



Conceal the gap between the top of the bookcase and ceiling with crown molding or sprung cove molding. Installing crown molding can get complicated- consult a trim carpentry book if you are unsure how to work with crown molding.



Attach the plinth blocks, rosettes and fluted case moldings to compete the trimwork installation.

Attach the short shelf cleats to the sides of the uprights so each shelf is supported on three sides (photo 10). Use a level to make sure the cleats are level and attach them with 4d finish nails or 1⅜" brads and adhesive.

Cut the remaining shelves to length and set them on the cleats. Cut the 1 × 2 shelf nosing and attach it to the front edges of the exposed shelves, making sure the shelves are flush with the top edge of the nosing (photo 11). Use 4d finish nails driven through pilot holes or pneumatic finish nails to attach the nosing.

ATTACH THE TRIM

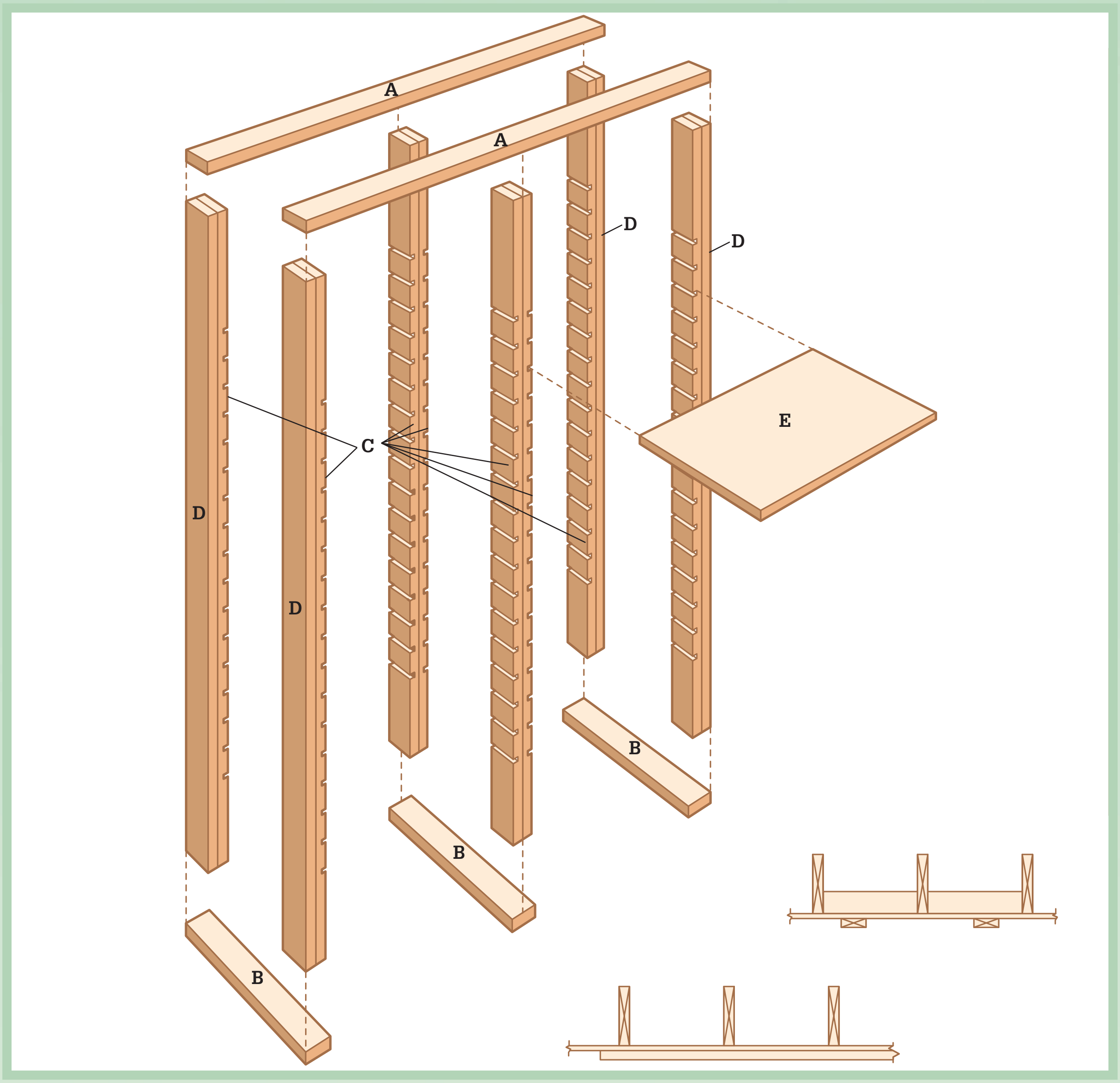
Cut the 1 × 10 red oak fascia board the full width of the bookcase and nail it to the top so the ends are flush with the outer faces of the outer uprights. Make sure the fascia board is level before attaching it with nails driven into the tops of the upright backers. Once the fascia board is in place, cut, fit and attach the crown molding and molding return at the top (photo 12).

Install the plinth blocks at the bottom of each upright backer, resting on the floor and centered side to side. Then, attach the rosettes at the top of each upright backer, centered side to side. Measure from the bottom of the rosette to the top of the plinth block and cut fluted case molding to fit. Install with adhesive and nails (photo 13). Fill nail holes, sand and apply finish. If the installation room has base shoe moldings, you may want to add them to your bookcase for a consistent look.

Utility Shelves

You can build adjustable utility shelves in a single afternoon using 2 × 4s and plain ¾" plywood. Perfect for use in a garage or basement, utility shelves can be modified by adding side panels and a face frame to create a finished look suitable for a family room or recreation area.

The quick-and-easy shelf project shown on the following pages creates two columns of shelves with a total width of 68". You can enlarge the project easily by adding more 2 × 4 risers and plywood shelves. Do not increase the individual shelf widths to more than 36". The sole plates for the utility shelves are installed perpendicular to the wall to improve access to the space under the bottom shelves.



Tools

- Pencil
- Tape measure
- Level
- Framing square
- Drill/driver
- Plumb bob
- Powder-actuated nailer
- Clamps
- Router with ¾" straight bit
- Circular saw
- Stepladder

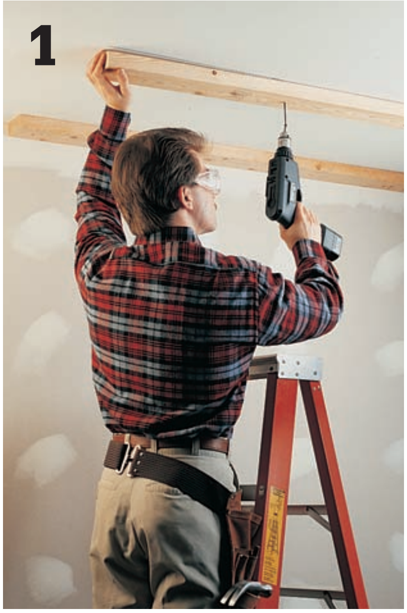
Materials

- (15) 2 × 4 × 8 pine
- (2) ¾ × 4 × 8 plywood
- Wood glue
- Shims
- Drywall or deck screws (2½", 3")
- Finishing materials

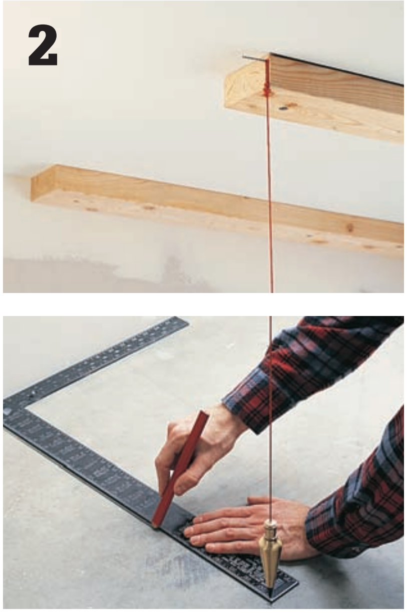
Cutting List

Part	No.	Desc.	Size	Material
A	2	Top plates	68"	2 × 4s
B	3	Sole plates	24"	2 × 4s
C	8	Shelf risers	93"	2 × 4s
D	4	End risers	93"	2 × 4s
E	12	Shelves	30¾ × 24"	¾" plywood

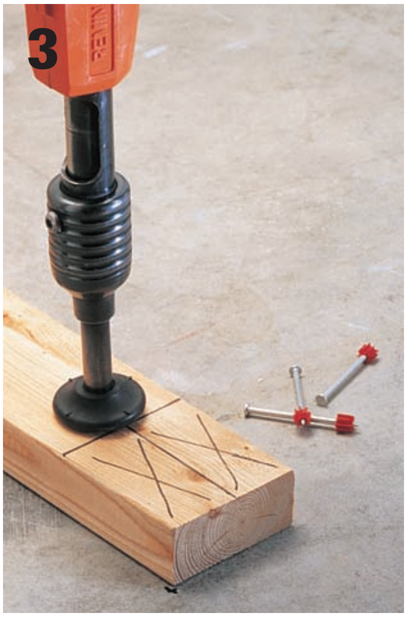
How to Build Utility Shelves



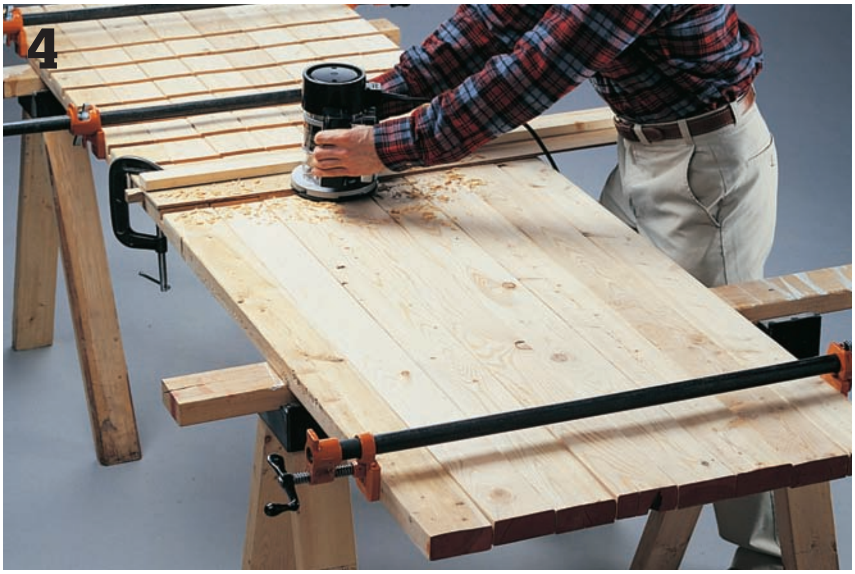
Mark the location of top plates on ceiling. One plate should be flush against wall, and the other should be parallel to first plate, with the front edge 24" from the wall. Cut 2 × 4 top plates to full length of utility shelves, then attach to ceiling joists or blocking, using 3" screws.



Mark points directly beneath outside corners of the top plates to find outer sole plate locations, using a plumb bob as a guide (top). Mark sole plate locations by drawing lines perpendicular to the wall connecting each pair of points (bottom).

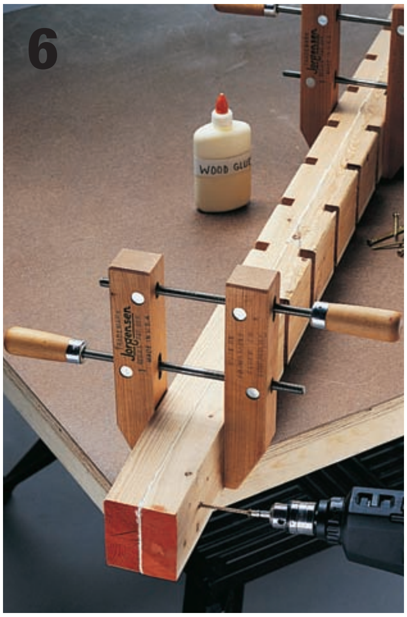


Cut outer 2 × 4 sole plates and position them perpendicular to the wall, just inside the outlines. Shim plates to level if needed, then attach to floor with a powder-actuated nailer or 3" screws. Attach a center sole plate midway between the outer sole plates.

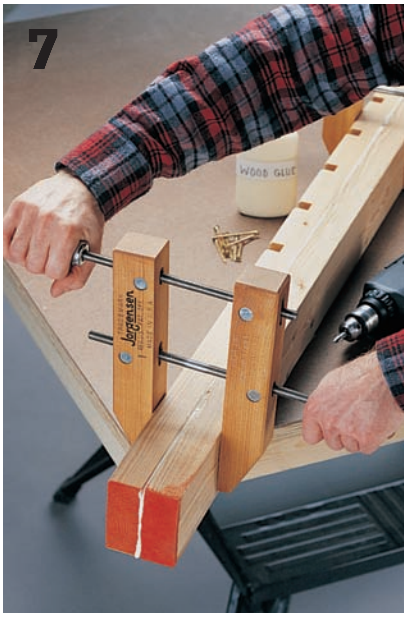


Prepare the shelf risers by cutting ⅞"-wide, ¾"-deep dadoes with a router. Cut dadoes every 4" along the inside face of each 2 × 4 riser, with the top and bottom dadoes cut about 12" from the ends of the 2 × 4. Tip: Gang-cut the risers by laying them flat and clamping them together, then attaching an edge guide (page 41) to align the dado cuts. For each cut, make several passes with the router, gradually extending the bit depth until dadoes are ¾" deep.

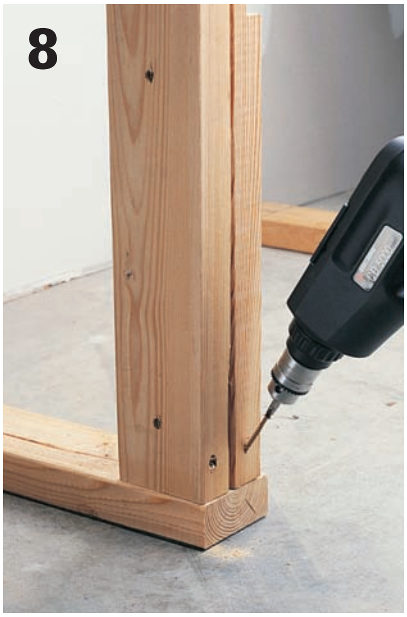
Trim the shelf risers to uniform length before unclamping them. Use a circular saw and a straightedge guide.



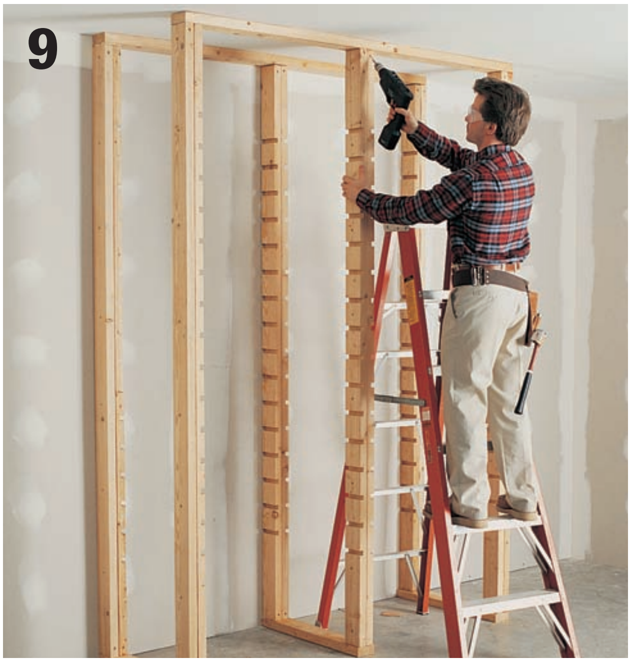
Build two center shelf supports by positioning pairs of shelf risers back-to-back and joining them with wood glue and 2½" screws.



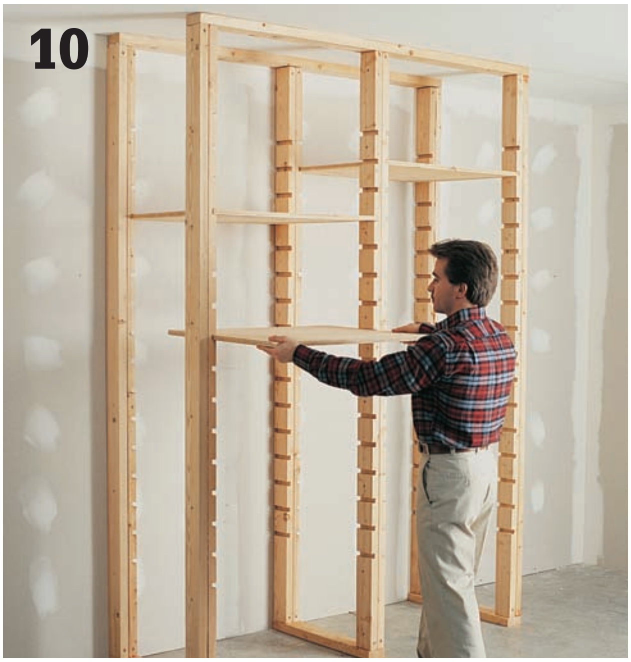
Build four end shelf supports by positioning the back of a dadoed shelf riser against a 2 × 4 of the same length, then joining the 2 × 4 and the riser with glue and 2½" screws.



Position an end shelf support at each corner of the shelving unit, between top and sole plates. Attach the supports by driving 3" screws toenail-style into the top plate and sole plates.



Position a center shelf support (both faces dadoed) at each end of the center sole plate, then anchor shelf supports to the sole plate using 3" screws driven toenail-style. Use a framing square to align the center shelf supports perpendicular to the top plates, then anchor to top plates.



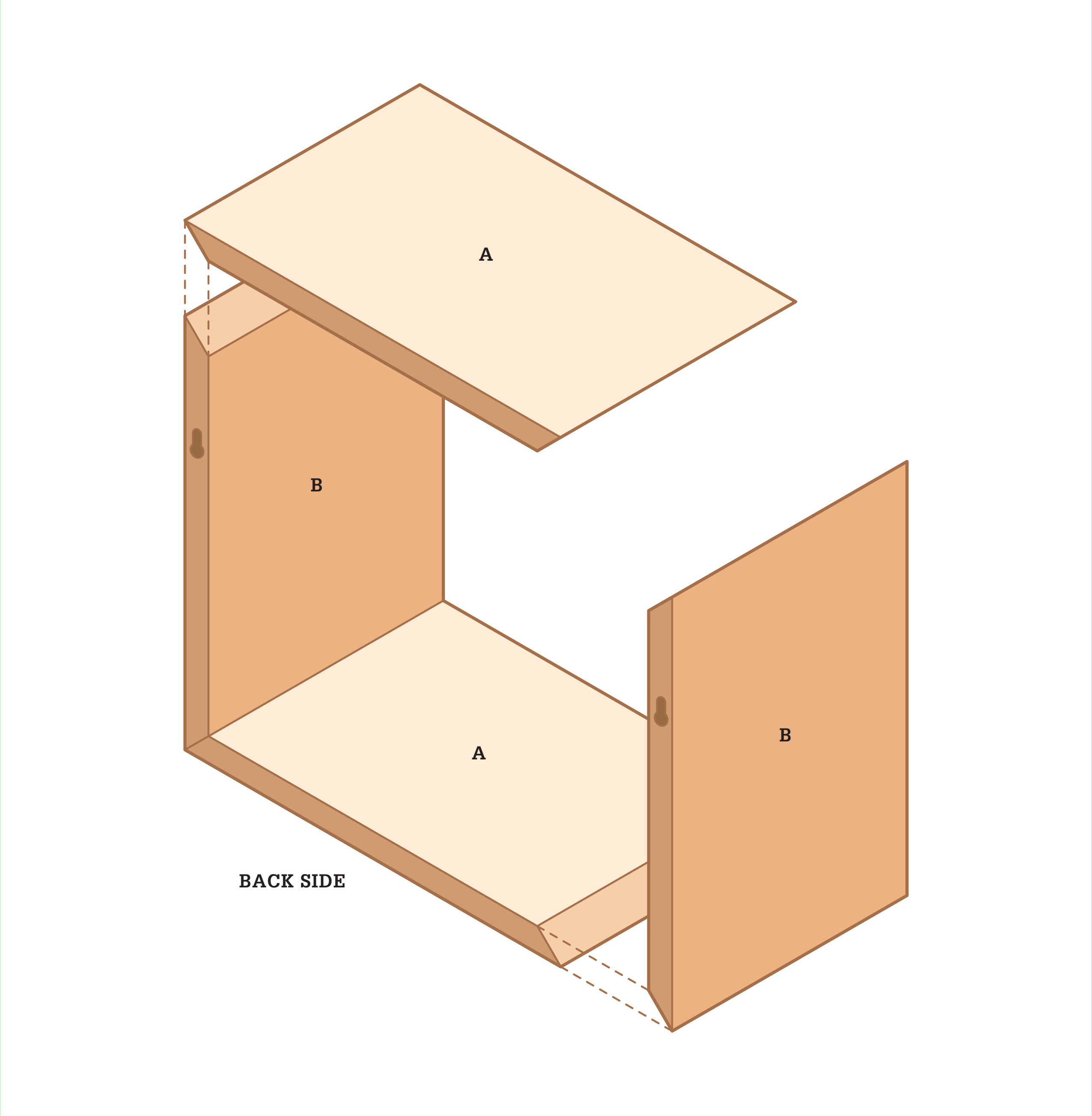
Measure the distance between the facing dado grooves and subtract ¼". Cut the plywood shelves to fit and slide the shelves into the grooves.

Cube Shelves

This shelving project will yield some lovely and distinctive display shelves, but building them is as much a skill-building adventure for learning new techniques as it is a carpentry project. If you're chomping at the bit to give your new sliding compound miter saw a workout, this project will be very satisfying for you. Yet these cube-shaped shelves are quite attractive and functional in their own right, constructed as they are with a combination of basic boards, simple hardware, and imagination.

You can make the cube-shaped display shelves from solid sawn wood or sheet goods, depending on the look you're after, what you'd like to display, and your decor. You can make them different sizes, squares or rectangles, deep or shallow. You can even take one of those squares and flip it on point to make a diamond. Versatility and fun is the name of the game here, along with careful assembly. Included in the assembly instructions are a few tips for making square corners so your handcrafted box is perfectly machined.

The assembly and connection details here are intended for small shelves and displaying light items, but final design is up to you. The shelf unit shown here is a 12" square made from cherry. You can use other species for different looks, or you can even mix and match species, paint some and leave others clear, or stain them to bring out the grain in the wood. Using a brad nailer and glue, or finish screws and glue, will provide solid mechanical connections for the corners. Trying to hand-nail this project is likely to result in frustration. Other attachment choices that work well for this project include a spline joint or using a plate joiner and biscuits. These tend to be more in the domain of the advanced woodworker due to the precision and tools required, however.



Tools

- Cordless drill/driver
- Circular saw
- Straightedge
- Sander
- ½"-wide wood chisel
- Table saw

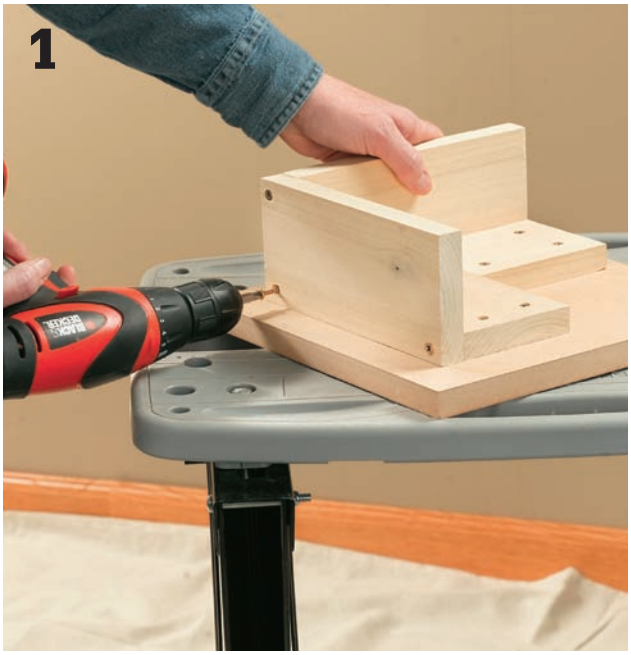
Materials

- Scrap wood for jig
- 1 × 8 hardwood (5 ft., or so)
- Keyhole picture hangers
- Fasteners

Cutting List

Part	No.	Desc.	Size	Material
A	4	Cube side	¾ × 7½ × 12"	Hardwood

How to Build Cube Shelves



Build this simple jig to assist you in making perfectly square miter joints.

MAKE A FOOLPROOF ASSEMBLY JIG

For making square joints, do yourself a favor and build a very simple assembly jig. The one shown here is easy to make from scrap stock. All you need to do is fasten four pieces of 8"-long scrap stock (poplar is good because it's very straight and easy to work with) to a flat piece of scrap plywood or MDF to form two L's that meet at a right angle. Before cutting your workpieces, make sure your miter saw is set up for a perfect perpendicular cut. Then, cut the four pieces and lay two of them flat on the plywood (about a 12" square will work) so they butt together and form a 90° joint. Fasten the two boards to the plywood, taking care to maintain an exact 90° joint. Pre-drill the boards so they don't move while you screw them down. After the flat pieces are installed, install the vertical pieces in a similar fashion, fastening them to the edges of the first workpieces (photo 1). Coat the outer faces of the jig with wax or varnish to prevent glued workpieces from sticking to it.

If You're Using a Power Miter Saw...

The easiest way to make the miter cuts in stock that's wider than 3" or 4" is to use a large capacity power miter saw or a radial arm saw. If you have a large capacity power miter saw, such as a 10" compound sliding miter saw, you need to make sure your miter saw is tuned to cut precise 45° miters. You'll also need a stop for your miter saw so you don't have to measure each piece individually. Because it's vital that each of the workpieces be exactly the same (even the smallest difference in the cuts will show up in the miters), the stop is key for making accurate cuts.

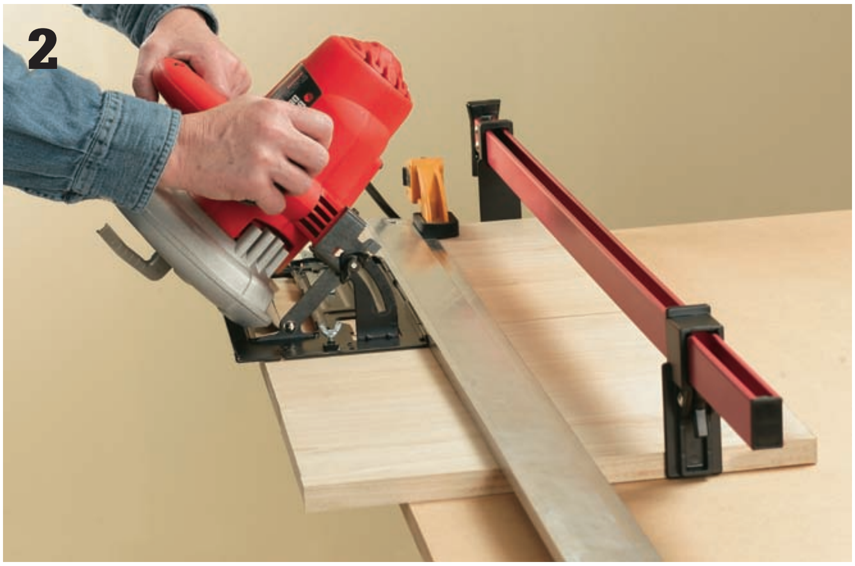
Accuracy is important in this project—especially for the tools. Double check your saw's setting before you begin cutting and adjust as necessary. If you're using a 10" saw, you'll be cutting on the bevel, so be sure to check this adjustment.

CUT THE SHELF PARTS

You can use a sliding miter saw or radial arm saw to make the bevel cuts that form the miters (see "If You're Using a Power Miter Saw…", page 200). But if you don't own a saw with enough capacity to make a 45° bevel cut in a 7½"-wide board, you can use an ordinary circular saw. First, carefully cut the workpieces so they're a couple of inches longer than the finished length (12" is the finished length we use here). Then, clamp the four boards together edge-to-edge using a bar clamp or pipe clamp. Leave plenty of room at one end (the ends of the boards should be flush). Set your circular saw to cut a 45° bevel. Then, clamp a straightedge guide in place so the distance from the unclamped ends is slightly more than the offset of the saw foot. Cut all four boards at once (photo 2).

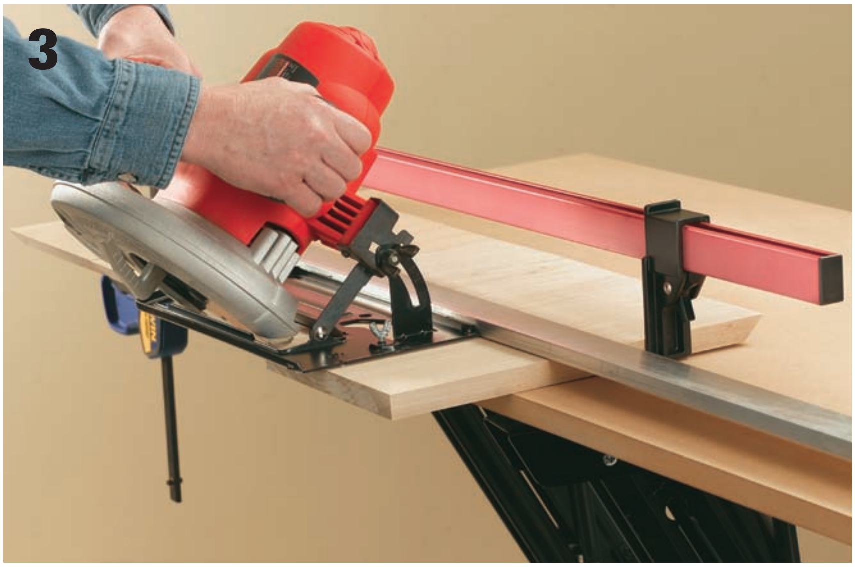
Relocate the clamp near the bevel-cut ends, reposition the straightedge guide and bevel-cut the other ends. Re-orient the workpiece so the miters will be facing in the correct directions. Make sure the bevels both slope inward, and make the second cut so the outside face of each workpiece is 12" long (photo 3).

2



Clamp a straightedge guide to the ganged workpieces and make a 45° bevel cut near one end.

3



Re-orient the workpieces so the bevels will not be parallel and gang them together again. Bevel-cut the other ends.

ASSEMBLE THE SHELF

Set two of the bevel-cut workpieces up in the assembly jig. Dry-fit the corner to see that it fits and the joint is tight. If it's not, something is off and an adjustment is required.

Apply glue to both ends and re-create the joint. Reinforce with finish nails driven with a pneumatic brad nailer (photo 4). Fasten the other two workpieces in the same fashion, and then attach the two L-shapes to form the finished square (photo 5). Make sure you wipe away all glue squeeze-out with a damp cloth or sponge and allow it to dry.

INSTALL HANGING HARDWARE

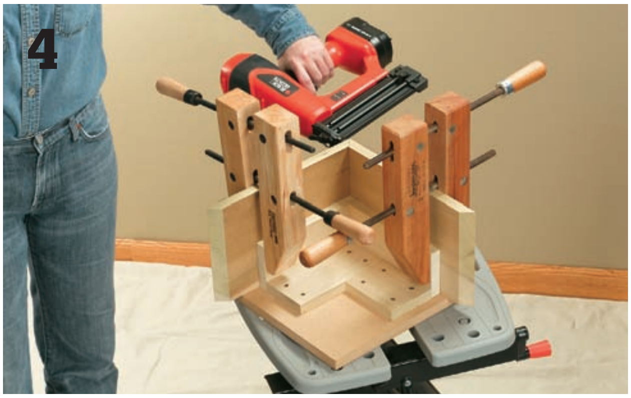
The cube-shape boxes look most impressive if they are mounted on the wall with no visible means of support. A good method for accomplishing this is to hang them with keyhole-style picture frame hangers that fit into recessed cuts in the back edges of the box. To hang the box with this hardware, position the box on the worksurface with the back edges up. Then, drill a ¼"-deep by $\frac{5}{16}$"-dia. hole that's 3" from each end along the edge you want to be on top. Chisel out a ⅛"-deep, ½"-wide × ¾"-long mortise that's centered over each hole and stops just shy of the edges of the board (photo 6).

Place the hanger in the slot over the pre-drilled hole and mark the screw holes with a pencil. Pre-drill the hanger holes and install the hangers, using a screwdriver to prevent overdriving (photo 7).

FINISH & HANG THE SHELF

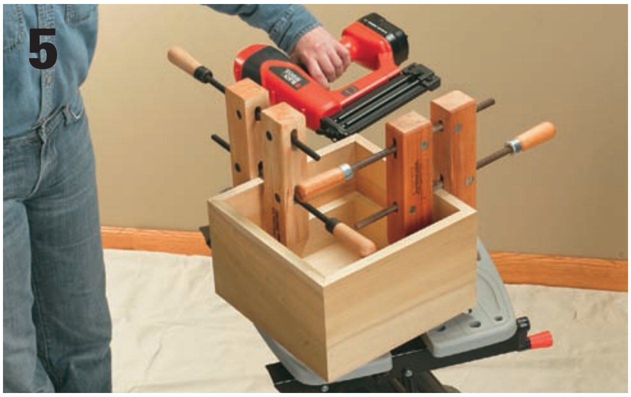
Apply your finish of choice and allow it to dry. Treating all faces of the shelf will help prevent environmental forces (like humidity and temperature change) from

4



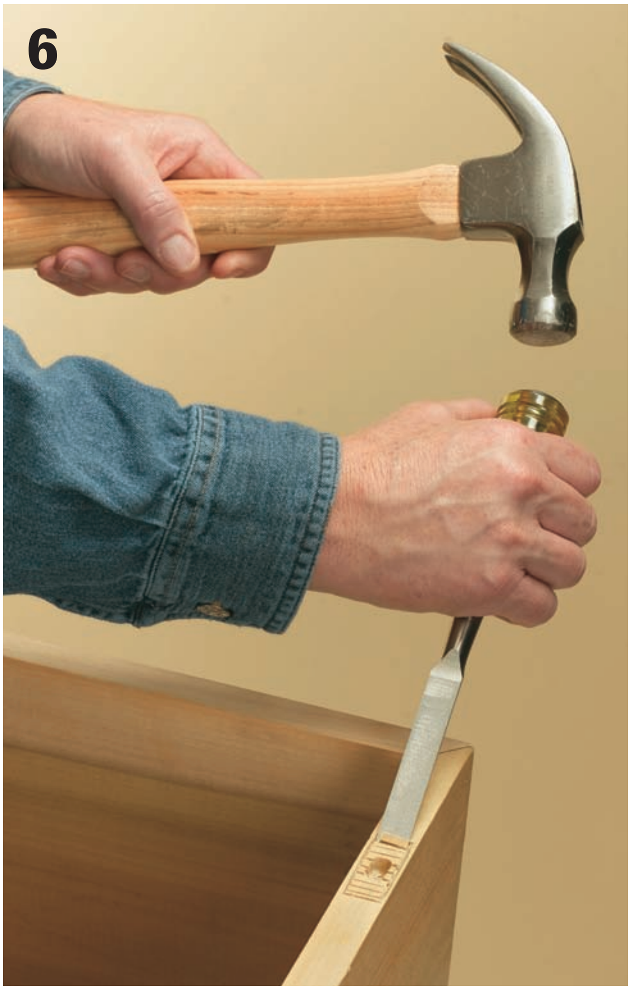
After testing the fit, glue the first miter joint together and reinforce it with an air nailer (if you must hand-nail, carefully drill pilots holes first). Use the assembly jig to square up the workpieces.

5



Using the jig, assemble both L's with glue and fasteners.

6



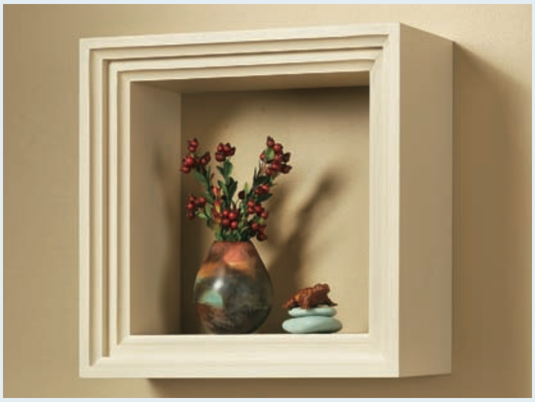
Cut a mortise for the body of the hanger hardware to rest in. Be sure not to cut through to the edge of the shelf so the connection will be invisible once the box is mounted.

opening the joints. Set the cube shelf level on the wall and mark the locations for the screws that will fit into the keyhole picture hangers. Drill guide holes for plastic wall anchors at the hanger locations and drive round-head wood screws so they leave a gap of about ⅛" between the screw head and the wall. Slip the box over the screwheads and tug downward to secure it (photo 8).

Stepback box variation ▸

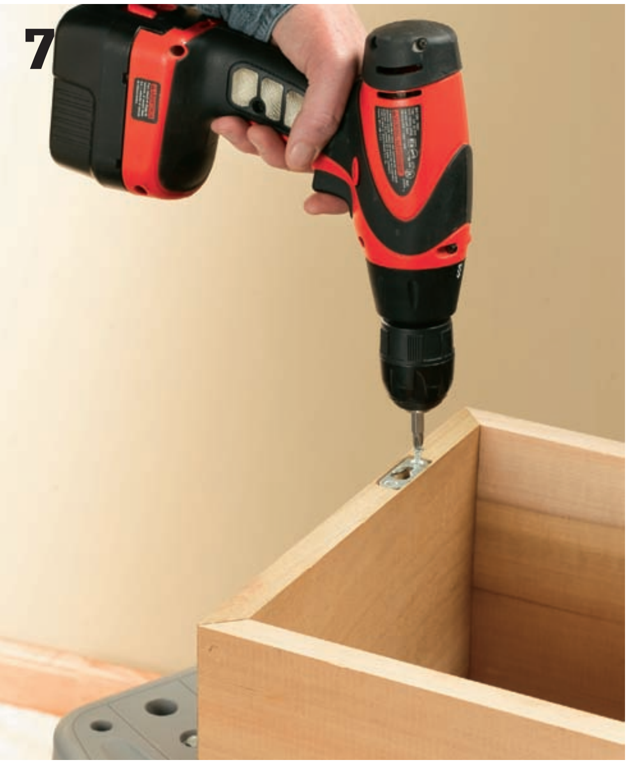
Making cube-shaped shelves can take you further than single layer display shelves, enabling you to add layers and depth to your display boxes and the items in them. In other words, some photos look great in a plain frame while others call out for more detail. The good news is that adding detail to the shelf doesn't require a major re-tooling of your set-up. You can still use all kinds of materials, including MDF (shown here), though sizing down to smaller stock for smaller shelves looks more proportional. And, because this version is layered, you can mix and match species to create an eye-catching color contrast.

Since there are 16 pieces in this system (not four) as in the project box—the easiest and fastest way to make accurate cuts is to cut and shape the stock for both the inner cube and outer cube, and then laminate them together with glue so the front edges are oriented correctly and the back edges are flush. Then, simply cut the workpieces, bevel the ends and assemble the cube as shown in the main sequence.



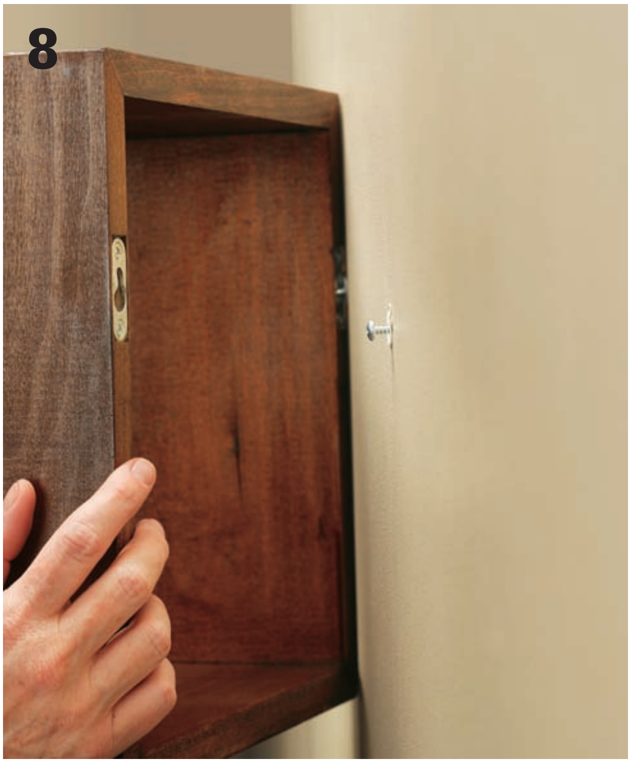
This 16-piece variation of the cube shelf has the added feature of shadow lines created by the stepped back sides.

7



Pre-drill the hanger holes and install the hanger hardware using a screwdriver or a drill/driver and a light touch.

8



Drive roundhead screws into the wall, using sleeves or anchors as needed. Then hang the keyhole hanger hardware mounted to the back of the shelf onto the screwheads.

Closet Shelves

This simple project will more than double the storage potential in a small linen or pantry closet. It is perfect for light loads in closets with a span of 36" or less. The 1 × 3 furring strips are inexpensive and easy to install, and the shelving seen from the outside of the door lends a professional touch. If you don't have a lot of time, but would like to try your hand at an installation to maximize your storage, start here.

Tools & Materials ▸

- Stud finder
- Tape measure
- Level
- Screwdriver
- Jig saw
- Nail gun
- 6d and 8d finish nails
- ¾"-thick shelving stock (without predrilled holes)
- 1 × 3 pine
- Wood screws
- L-brackets (optional)
- Finish materials

How to Install Closet Shelves

Measure from the floor up 15" and mark a level line. Repeat level lines every 12" up from original line (repeat four times for an 80"-tall closet) (photo 1).

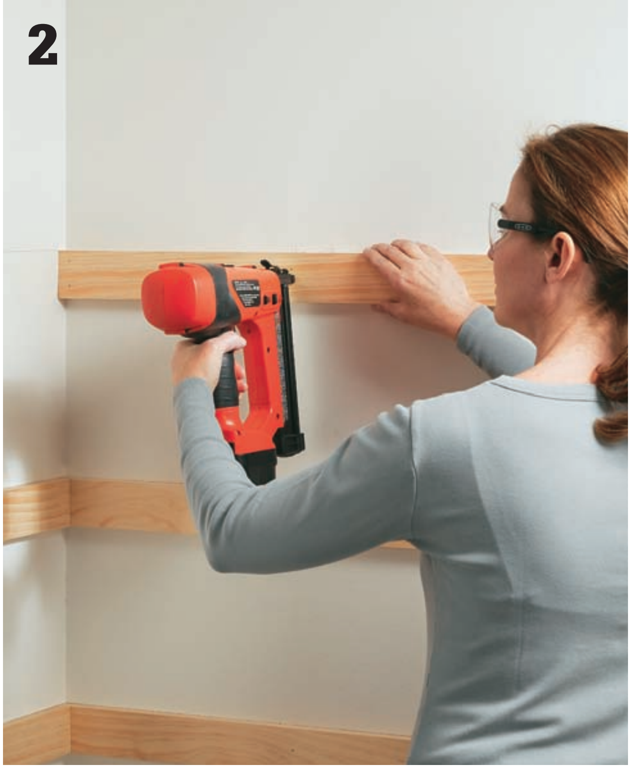
Cut 1 × 3 strips to fit along the back side of the wall, flush into each corner. Cut 1 × 3 strips to fit along walls, flush against the back wall 1 × 3 strips and 4" short of the inside wall (approximately 6" in from closet door track). Align the tops of 1 × 3 strips with level lines on wall and fasten to the wall, hitting studs where possible (photo 2). *Note: If you cannot hit a stud, use a self-driving metal anchor with machine screws every 10".*

Cut melamine shelving stock (without pre-drilled holes) to fit along the back side wall (measure wall and subtract 4"). Rest shelves on top of the 1 × 3 strips (photo 3).

1

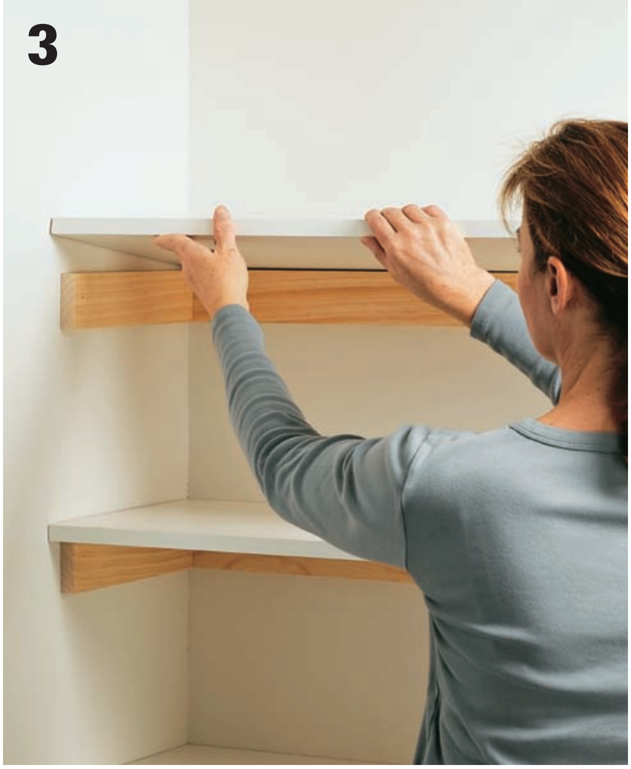
Measure from the floor up 15" and mark a level line. Repeat level lines every 12" up from original line (repeat four times for an 80"-tall closet).

2



Fasten 1 × 3 strips to back side wall, flush into each corner, and fasten 1 × 3 strips along the side wall (as shown, ending approximately 6" in from door track). Align the tops of the 1 × 3 strips with level lines on wall and fasten to wall with a nail gun at studs. *Note:* If you cannot hit a stud, use a self-driving metal anchor with machine screw every 10".

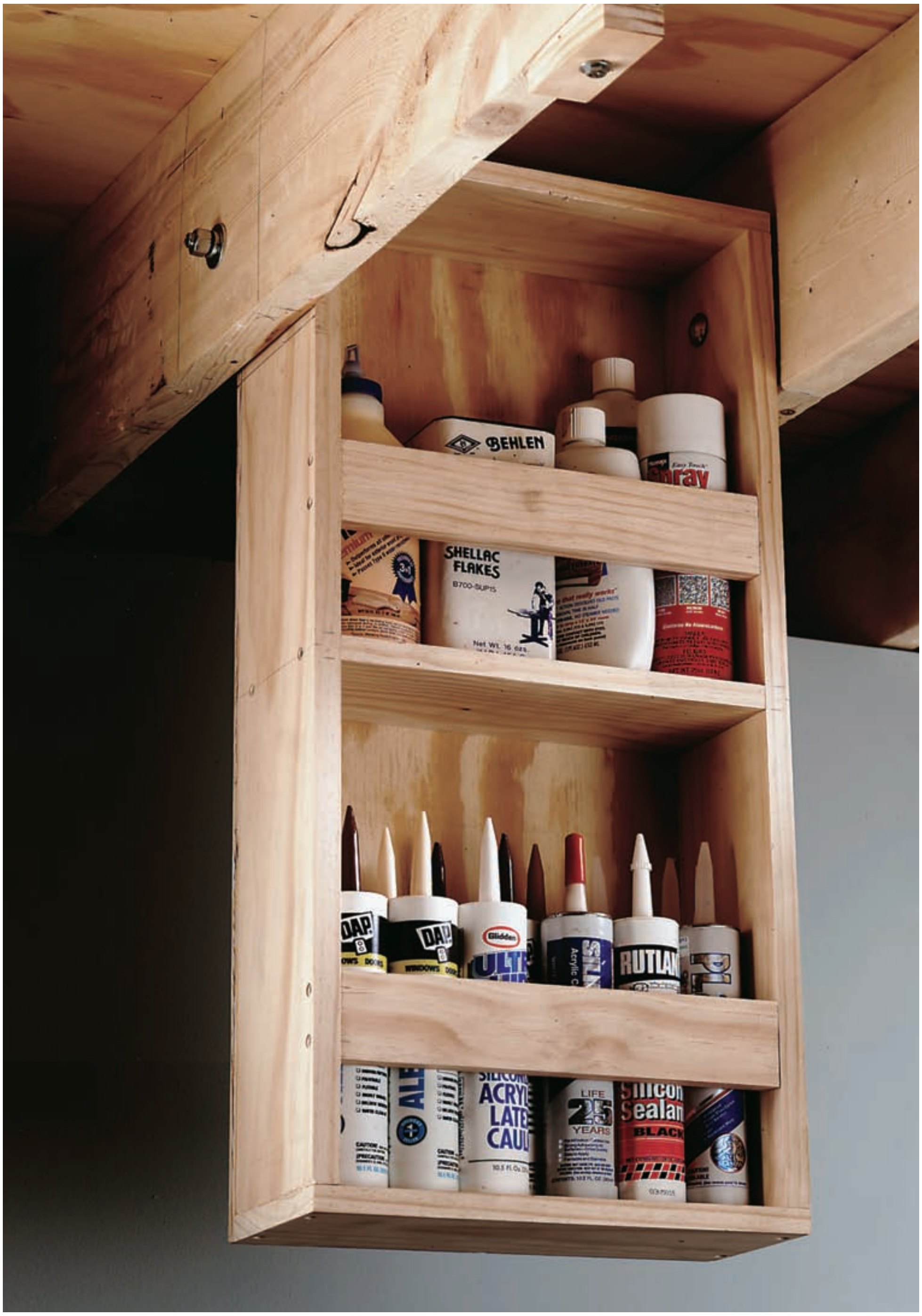
3



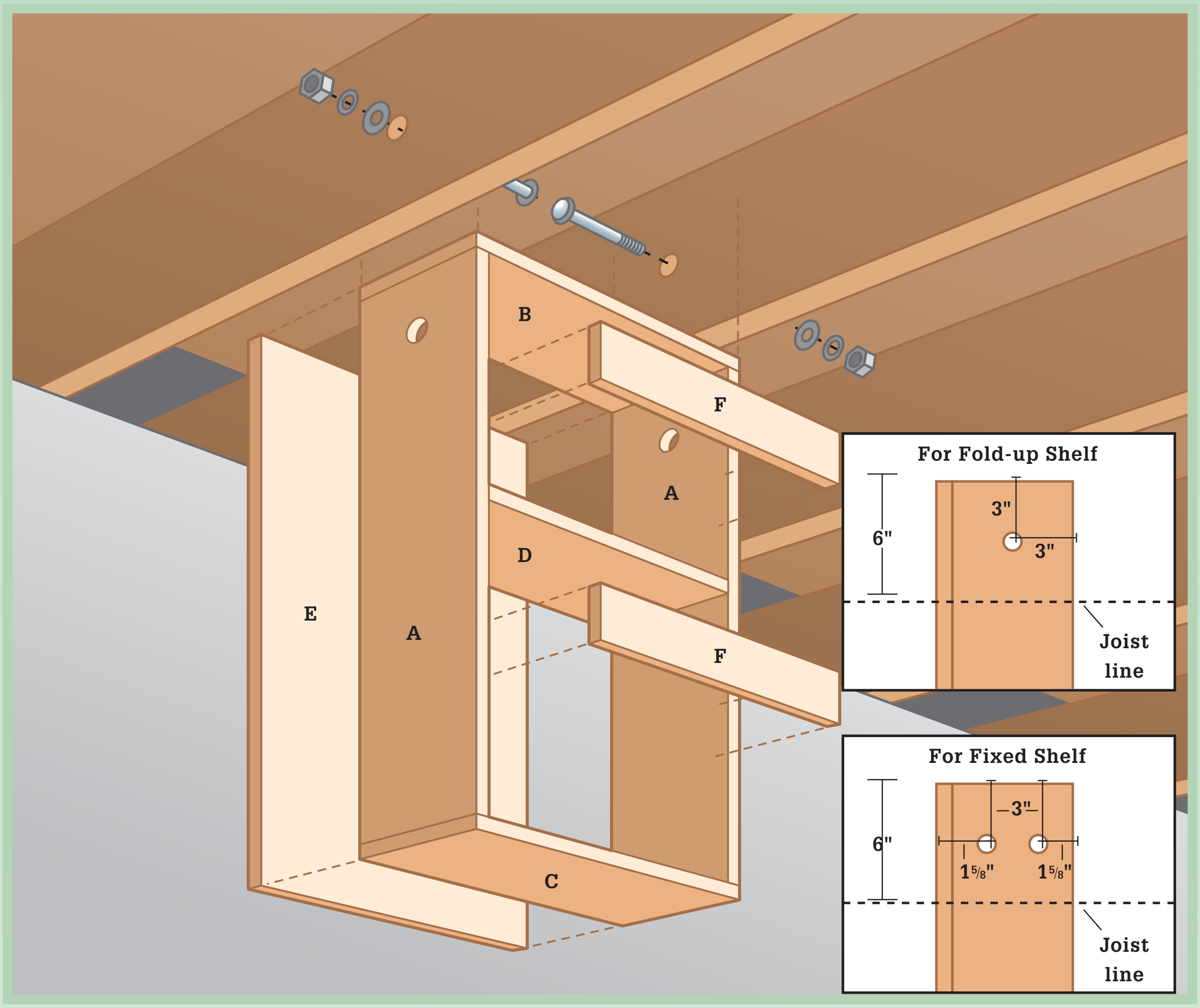
Cut melamine-coated shelving stock (without predrilled holes) to fit along back side wall (measure wall and subtract 4"). Rest shelves on top of 1 × 3 strips.

Joist Shelving

If you think you have completely run out of storage space, but still have an unfinished ceiling somewhere in the house or garage, think again. This handy little shelf is built to fit and fold up directly between unfinished joists, storing utility items until you need them. It is a good place for tools, laundry room supplies, smaller sporting goods, or other items you don't use every day. If you plan on storing liquids on the shelf, make sure the lids are closed tightly before folding up the shelf. The design of the shelf is easy to change to make it stationary or deeper. With a minimum of effort and materials, you can build a simple storage solution for utility items.



Turn joist cavities into efficient storage cabinets with these inexpensive, easy-to-build folding shelves.


B
F
A
D
E
A
F
C
For Fold-up Shelf
3"
6"
3"
Joist line
For Fixed Shelf
6"
3"
1⅝"
1⅝"
Joist line

Tools

- Drill with bits
- ½" spade bit
- Circular saw
- Ratchet set
- Combination square
- C-clamps
- Level
- Tape measure

Materials

- (1) 1 × 6" × 10 ft. pine
- (1) 1 × 4" × 6 ft. pine
- (1) ½" × 4 × 4 ft. pine plywood
- (2) ½"-dia. × 3" carriage bolts
- (2) ½" lock washers
- (4) ½" flat washers
- (2) ½" hex nuts
- (1) ¾"-thick plywood scrap
- Wood screws (#6 × 1½")
- Wood glue
- (2) ¼ × 2" lag screws

Cutting List

Key	Part	Dimension
A	(2) Side	¾ × 5½ × 30½" pine
B	(1) Top	¾ × 5½ × 14*" pine
C	(1) Bottom	¾ × 5½ × 14*" pine
D	(1) Middle shelf	¾ × 5½ × 12½*" pine
E	(1) Back	½ × 14* × 32" pine plywood
F	(2) Shelf rail	¾ × 2½ × 12½*" pine

*Cut to fit

How to Make Joist Shelving

Before you begin cutting the pieces for the frame of the joist shelving, measure the space between the joists where you plan to install the unit. Standard construction should leave a 14½" space between ceiling joists. However, depending on how old the wood is and how your house has settled, the space between your joists could be anywhere from 12" to 16". Make sure you know those dimensions so you can plan the rest of the box construction accordingly.

MAKE THE BOX

Measure and cut the sides (A), top (B), bottom (C), and middle shelf (D) of the box frame to size from 1 × 6 pine lumber and sand the edges smooth. Position the sides, top, and bottom panels with their back edges on the work surface, with the perimeter of the box flush at the outer edges.

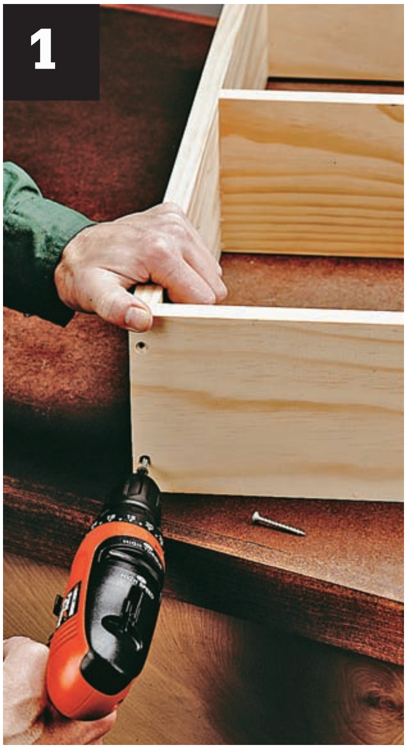
Drill counterbored pilot holes through the bottom and top panels into the side panels and assemble the frame, using glue and wood screws driven through the ends and into the sides (photo 1).

ULTRA HIDE
SILICONIZED ACRYLIC LATEX CAULK
ZERO WHITE
SILICONIZED
Acrylic Caulk
WHITE COLOR

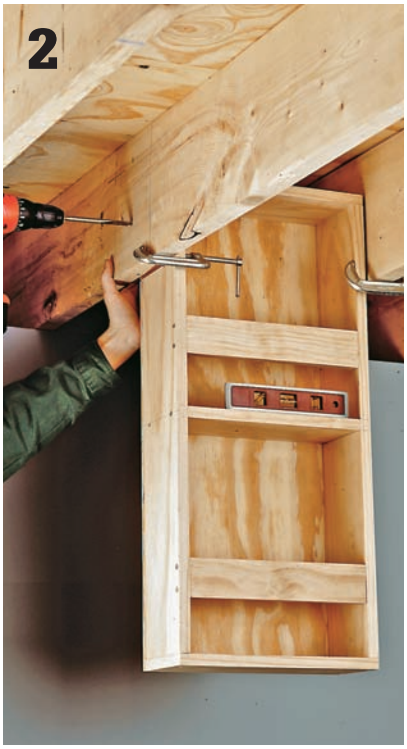
Using a combination square as a guide, mark a reference line across the interior face of each side panel, 15¼" up from the top of the bottom panel. These lines represent the bottom of the shelf.

Slide the middle shelf into position so the bottom edge is flush with the reference lines. Drill counterbored pilot holes through the sides and into the shelf. Attach the shelf using glue and screws.

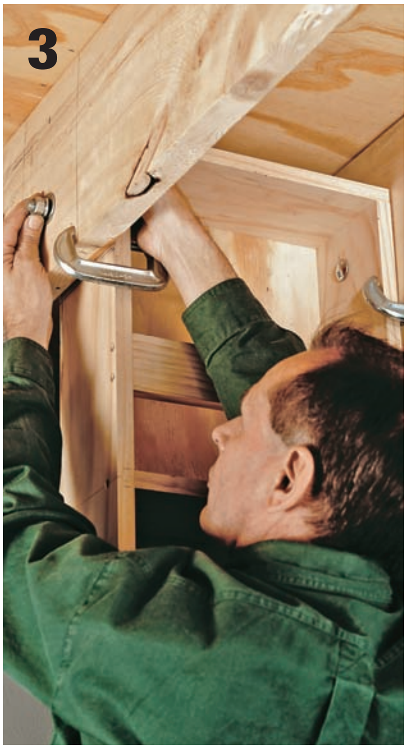
Cut the shelf rails (F) to the proper length and sand the edges smooth. Mark reference lines for the shelf rails 6" up from the top of the bottom panel and 6" up from the top of the middle shelf.



Assemble the frame of the box, using glue and 1½" wood screws.



Clamp the shelf in place between the joists and drill holes for the carriage bolts.



Insert a carriage bolt through the shelf walls and joists, then add a washer, lock washer, and hex nut.

Attach the rails so their top edges are flush with the reference lines and the front surface of the rail is flush with the sides. Drill counterbored pilot holes through the rails and into the sides and attach them, using glue and wood screws. Cut the back panel (E) to size and attach it to the back edges of the box frame, using glue and wood screws.

DRILL HOLES THROUGH THE JOISTS

Refer to the top inset of the diagram on page 207 for specific instructions on the location of the swinging assembly holes.

Clamp the unit into position between the joists so it is level and so the top of the shelf is approximately 3" from the subfloor above. When the shelf is in position and clamped tightly, drill a ½" hole on either side of the shelf, through the joists and into the shelf (photo 2).

INSTALL THE SWINGING ASSEMBLY

Slide the carriage bolts through the holes from the interior of the shelf, and thread a flat washer, lock washer, and nut onto the carriage bolt until they are snug, using a ratchet set if necessary (photo 3). Do not overtighten the assembly or the shelf will not rotate.

Test the shelf by rotating it up into the ceiling, making sure it glides easily between the joists. With a pencil, make a reference mark on both joists, approximately 2" in from the bottom edge of the shelf in the up position.

INSTALL THE CLEATS

Cut the scrap piece of ¾" plywood into two pieces approximately ¾ × 1½ × 4". Use two ¼ × 2" lag screws to attach the scrap pieces of plywood to the bottom edges of the joists so that the edges are flush with the inside edges of the joists (photo 4). The scrap pieces should be tight but still easy to rotate. Rotate cleats to hold the shelf in its closed position.

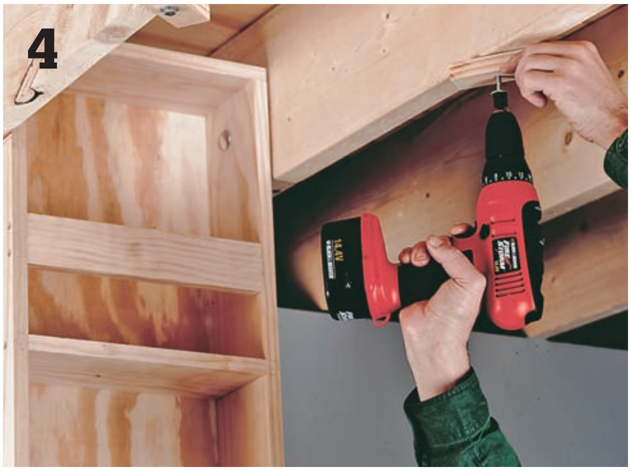
Variation ▸

If you want a deeper shelf (photo 5), use the same construction method, but alter the dimensions. Install this larger box by driving four lag screws through the joists. The shelf will be stationary, but it will still utilize space near the ceiling. See the bottom inset diagram on page 207.

Warning ▸

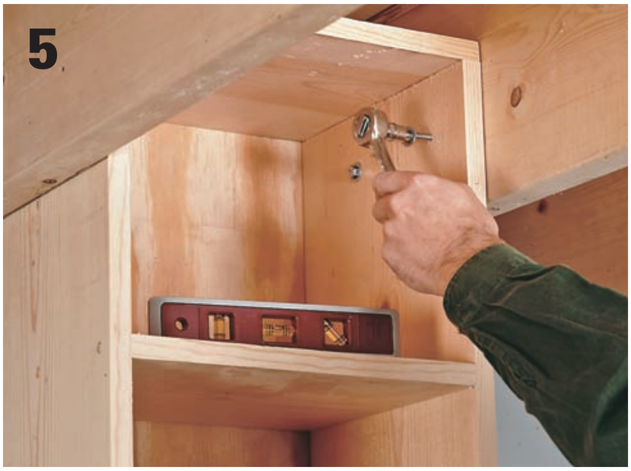
The shelf must be clamped tightly in place; otherwise, it may fall during installation. Do not place weight on the shelf until it is completely installed, or you could risk injury.

4



Screw plywood cleats into position to act as latches for the shelf.

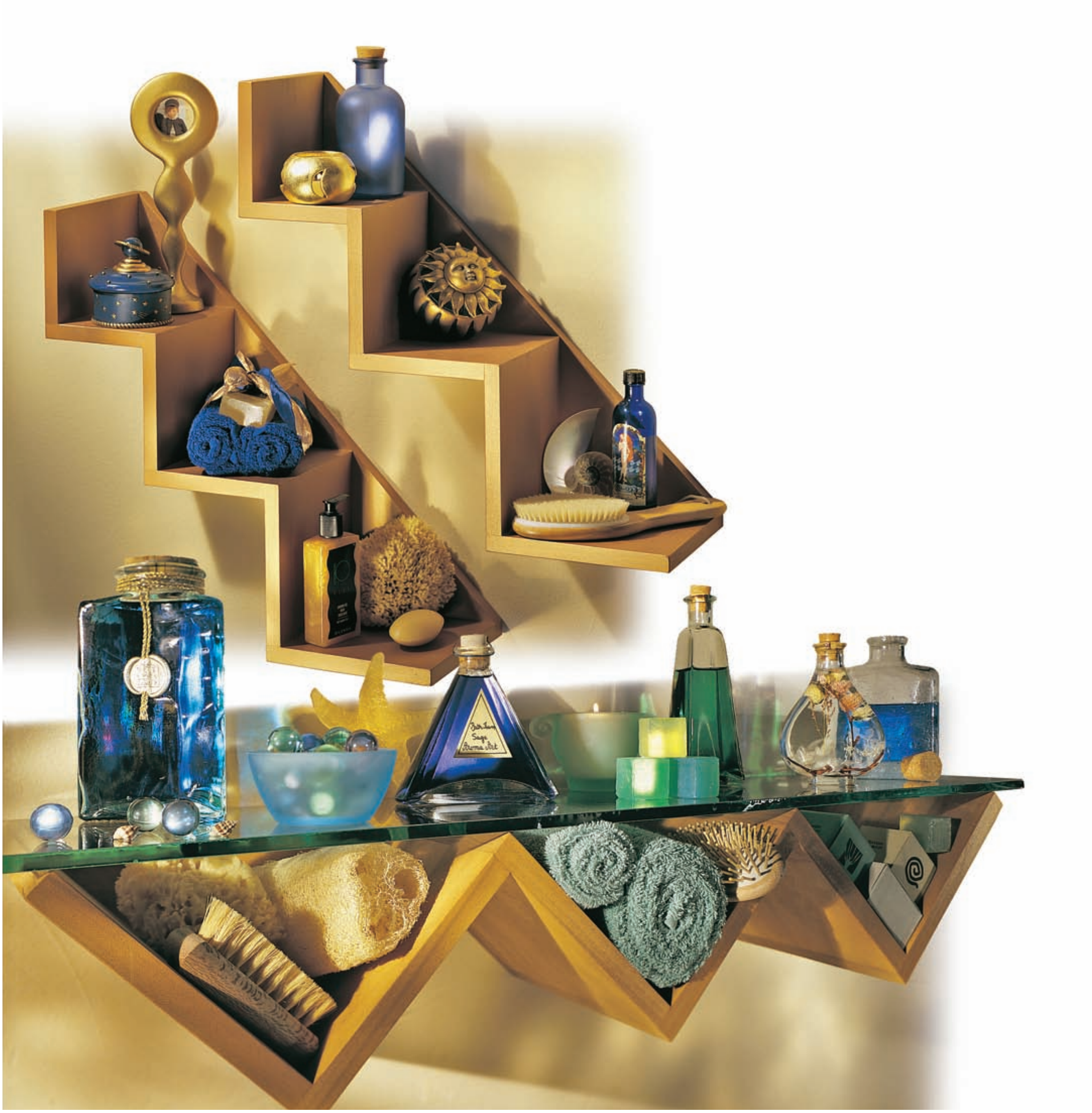
5



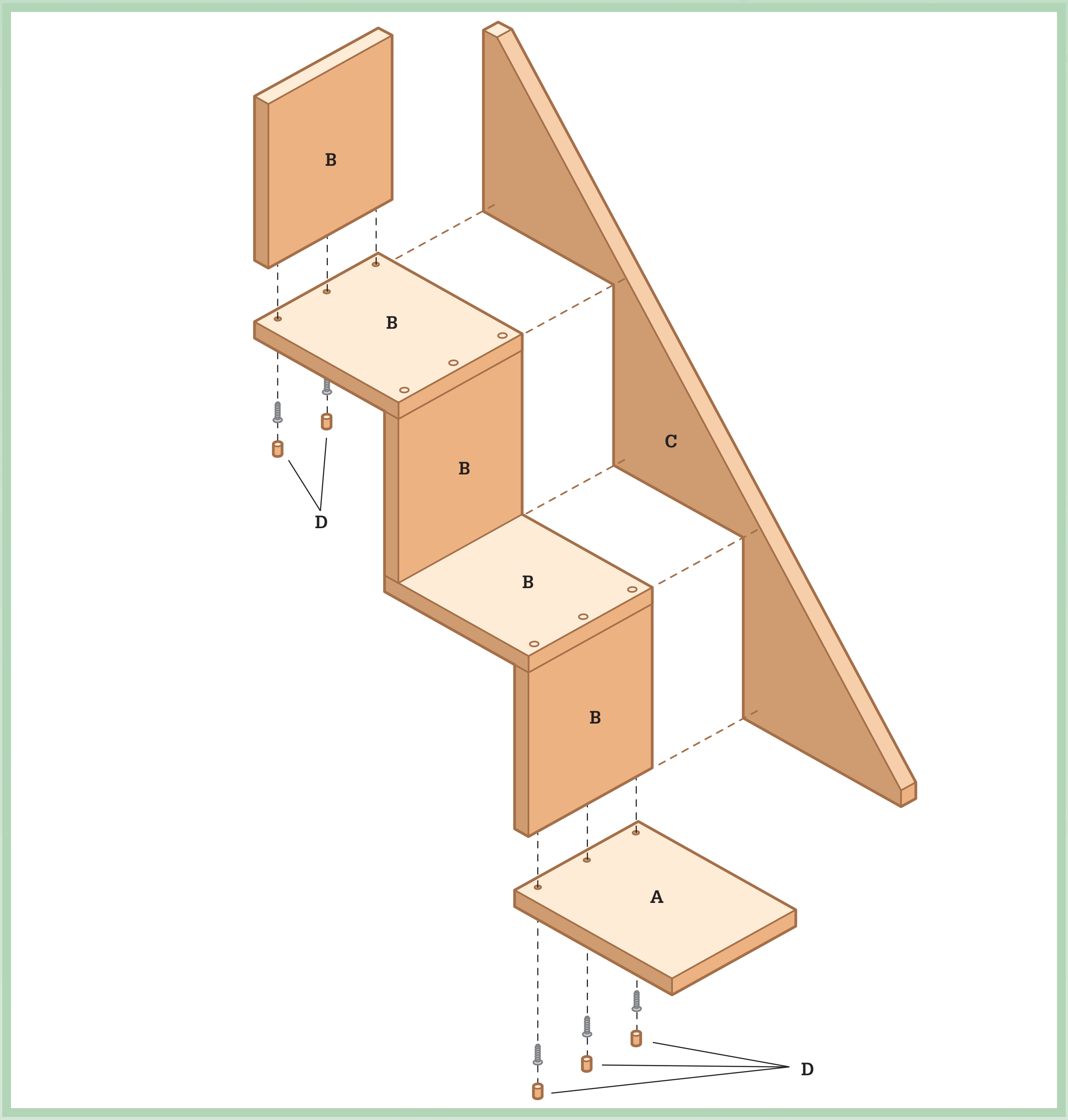
To build a deeper, stationary shelf, build the unit with wider lumber, and drive two ½ × 2" lag bolts through each side of the shelf and into the adjoining joists.

Bin & Shelving Unit

This versatile wall accessory offers clever storage space for rolled hand towels, soaps, and other small items. The unit can be custom-designed to fit the available wall space and depth for any room. In areas with less wall space, a shorter unit may be built by making only two V-sections. Or, add more V-sections for a larger wall space. For even more versatility, the V-sections may be mounted in stair-step fashion.



Store smaller items in the bins of this shelving unit, reducing clutter on your countertop or vanity.



Tools

- Miter saw
- Jig saw
- Clamps
- Drill with bits
- #8 adjustable counterbore bit
- Hammer
- Small hand saw
- Stud finder

Materials

- 1 × 6" × 4 ft. pine
- 1 × 8" × 4 ft. pine
- ⅜"-dia. dowel
- Cotton swabs
- Wallboard screws (#8 × 1⅝")
- Wood glue
- Finishing materials
- Sandpaper

Cutting List

Key	Part	Dimension
A	(1) Shelf panel	¾ × 5½ × 8¼" lumber
B	(5) Shelf panel	¾ × 5½ × 7½" lumber
C	(1) Backer board	¾ × 7¼" × 3 ft. lumber
D	(15) Dowel pieces	⅜"-dia × ½" dowel

How to Make a Bin & Shelving Unit

CUT SHELF PANELS & ASSEMBLE A V-SECTION

Cut the longer shelf panel (A) and all five additional shelf panels (B) to size using a miter saw. Sand any rough edges smooth using 150-grit sandpaper.

Position the panels on the table as they will be assembled, checking the fit and layout of each panel. Make sure the longer shelf panel (A) is farthest to the right of the assembly.

Clamp the longer shelf panel (A) to one of the regular shelf panels (B) at a right angle so that the edges are flush against the worksurface (photo 1).

Adjust a #8 counterbore bit to a total depth of 2". Drill three equally spaced counterbored pilot holes through the longer shelf, 3/8" from the lower edge. Each hole should have a 1/4" counterbore. Drive 1 5/8" wallboard screws into each hole of the clamped assembly.

ATTACH THE REMAINING SHELF PANELS

Attach each remaining shelf panel at a right angle, repeating the construction methods described in the first step. Clamp each new shelf to the workpiece so that the new shelf is flush against the worksurface, with the side edges of each new panel flush with the side edges of the workpiece (photo 2).

PREPARE THE BACKER BOARD

Lay the completed shelf assembly on the backer board, so that the top point of each V-section is flush with the backer board's top edge.

Trace the outline of the V-sections on the backer board and cut along the lower cutting lines using a jig saw (photo 3).

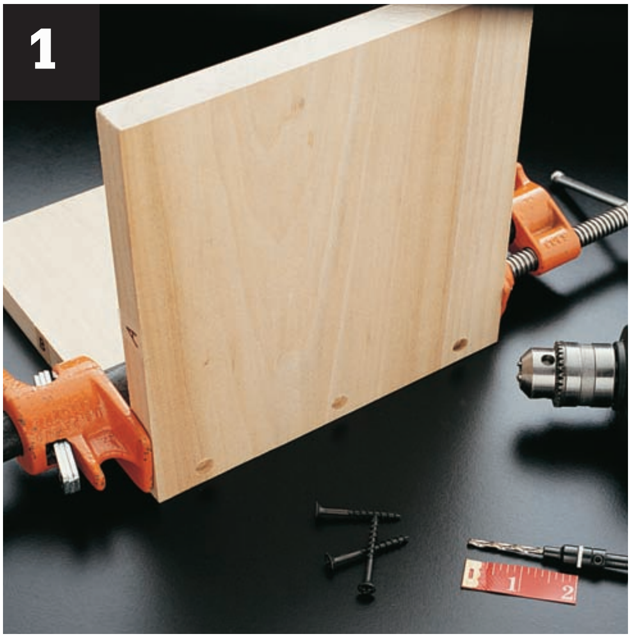
Draw lines on the front of the backer board showing the locations of the wallboard screws in the V-section assembly.

Mark the position for three screws along each side of the V-sections, avoiding the lines made for the wallboard screws inside the V-sections. Then drill holes through the backer board at the placement marks, using 1/8" drill bit.

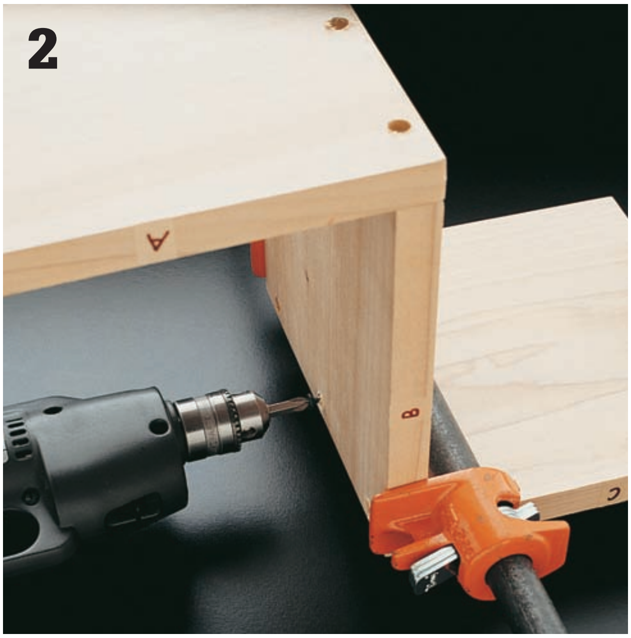
INSTALL THE BACKER BOARD

Place unit on the table, with the front edge facing down. Turn the backer board over, and position it on top of the workpiece, aligning the edges.

Keeping the unit aligned with the backer board, drill a pilot hole in the placement mark closest to the center of the middle V-section with the adjustable counterbore bit. Only drill deep enough with the bit to create a countersink for the head of the screw.



Clamp shelf A to shelf B and drill three equally spaced counterbored pilot holes through shelf A into shelf B.



Clamp each new shelf to the workpiece so that the new shelf is flush against the worksurface.

Drive a wallboard screw into the countersunk pilot hole (photo 4) and recheck the alignment of the two pieces.

Drill and countersink the remaining pilot holes and drive wallboard screws through the holes into the V-sections, starting with the ends of the unit and working your way back toward the center.

APPLY THE FINISHING TOUCHES

Cut a ⅜" dowel into ½" lengths to use as wood plugs for the counterbored holes. Bevel one end of each plug by sanding or filing it slightly.

Place a small amount of wood glue in the counterbored holes using a cotton swab. Insert a wood plug into each hole, beveled end first, and tap it in place with a hammer or a rubber mallet (photo 5). Wipe away any excess glue using a dampened cloth. Allow the glue to dry overnight.

Sand the outer edges of the backer board and edges of the shelves. Cut off the excess of the plugs after the glue has dried using a small hand saw. The plugs should only extend slightly from the surface. Take care not to scratch the wood surface when trimming the plugs.

Sand the plugs flush with the surface, using 80-grit sandpaper on a sanding block. Sand the entire unit until smooth, using fine-grit sandpaper.

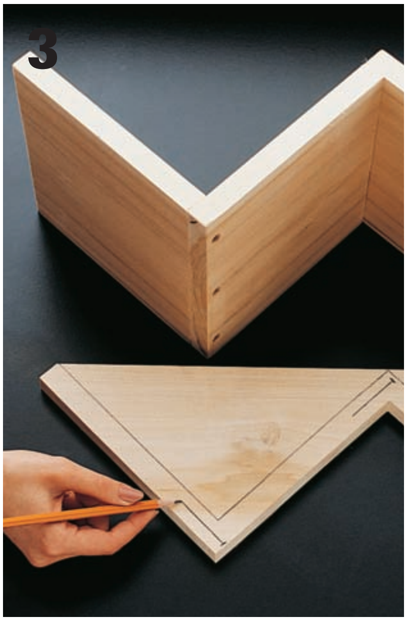
Paint the unit or apply the stain of your choice and a clear acrylic finish. Let the finish dry according to the manufacturer's instructions.

To mount the shelving unit, locate studs in the wall to use as mounting points. If no studs are available, make sure to use the proper type of wall fastener.

Variation ▸

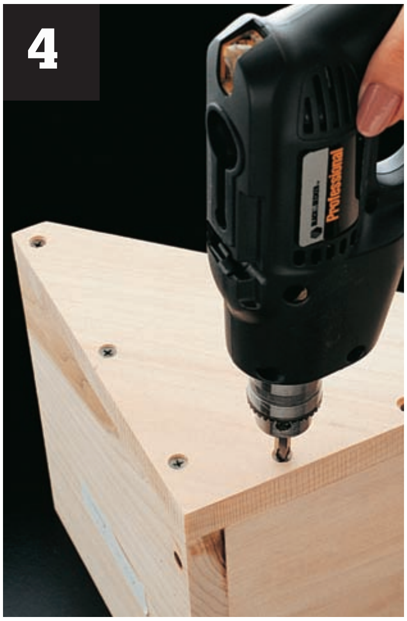
Using the same assembly steps, make a diagonal shelving unit as shown on page 210. Increase the "step up" effect by cutting the shelf panels to graduated lengths. Cut the lowest shelf at 8¼" long, the second shelf at 7½" long, the next two at 6½", and the last two at 5½" long. Then hang the shelf on the wall diagonally. The graduated shelves allow you to place heavier, larger objects on the lower shelves and lighter more decorative pieces above.

3



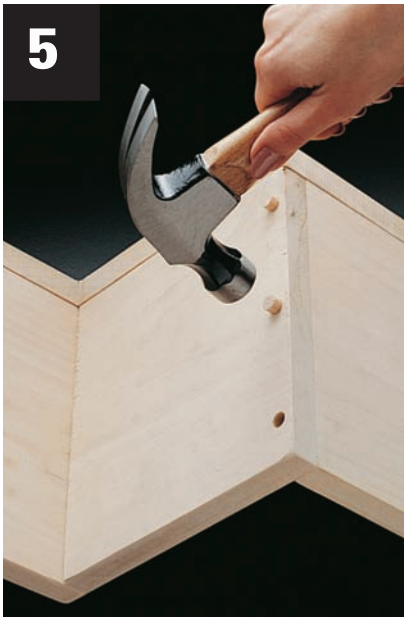
Mark lines on the backer board front indicating where the V-sections are screwed together. Then mark reference lines for three screws along each section.

4



Position the backer board over the workpiece, aligning the edges, and drive screws through countersunk pilot holes starting with the hole closest to the center.

5



Tap the wood plugs into the counterbored holes. Allow the glue to dry, and trim the wood plugs using a small hand saw.

Trimwork Wall Shelves

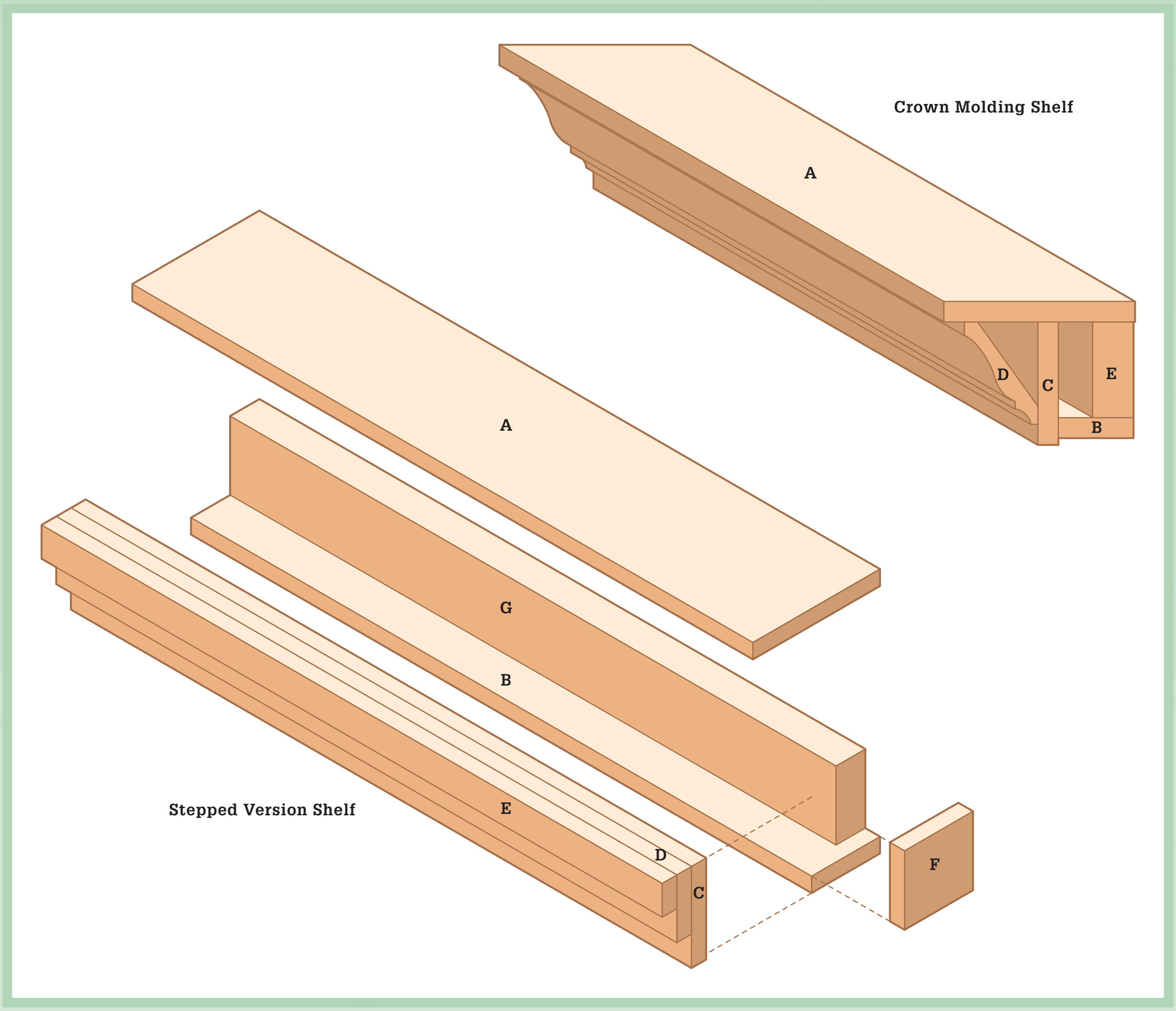
Here's a neat trick: Build a shelf that stores, displays and elevates your favorite collectibles and knick knacks so they're well within sight but safely out of the way. Building these built-up projects is a fun mix of rough and finish carpentry. We show you how to make two variations here: one is a mass of stepped-back MDF strips that has real presence when painted. The other is a more refined three-part assembly similar to cornice molding that is made with pine and pine moldings and boasts a clear wood finish. The feature both shelves share is a broad, flat surface that performs as a handy display shelf.

If you're building the crown molding version of this project, one skill you may wish to brush up on ahead of time is cutting and coping crown molding. Working with crown molding requires some mental gymnastics, but once you learn the floor routine you'll be glad you did.

You can hang your new shelves at just about any height, although they naturally look more comfortable higher up on the wall. At least try and position them at or slightly above eye level. Locating the shelves so the bottom edge rests on top of a door head casing is one good strategy.

In this project we detail two basic interpretations of the shelving strategy. Both are essentially built-up box beams, although one uses crown molding as the featured trim while the other is based on stepped-back strips of stock. There are also different variations on how the shelf can be installed. For example, you can wrap the entire room with it, simply span from one wall to another, or place it on three walls only, etc. Not only is this built-in totally home-made, but the design is flexible to suit different needs and tastes. And by choosing trim types and styles that already are present in your home you can enhance the built-in look.

The two styles of trimwork shelves seen here are constructed with simple butt joints for ease of building. If you have the woodworking equipment and skills, consider using dado joints instead of butt joints where it makes sense. With dado joints, the wood parts can expand and contract (as they are prone to) without creating separation gaps.



Tools

Table saw
Miter saw
Level or laser level

Drill/driver and bits
Tape Measure
Square

Materials

Drywall or deck screws
Finish nails
Finishing materials

Cutting List: Crown version

Part	Desc.	No.	Size	Material
A	Shelf top	1	¾ × 7" × length	Pine or oak
B	Shelf bottom	1	¾ × 2¾" × length	Pine or oak
C	Shelf front	1	¾ × 4½" × length	Pine or oak
D	Crown	1*	¾ × 4¼" × length	Crown molding
E	Ledger	1	1½ × 3½" × length	2 × 4
F	Filler (opt.)	1 or 2	¾ × 2¾ × 3½"	Pine or oak

* Make mitered return if end of shelf is open

Cutting List: Stepped Version

Part	Desc.	No.	Size	Material
A	Shelf top	1	¾ × 6½ × length	MDF
B	Shelf bottom	1	¾ × 3½ × length	MDF
C	Shelf front L	1	¾ × 4½ × length	MDF
D	Shelf front M	1	¾ × 3 × length	MDF
E	Shelf front S	1	¾ × 1½ × length	MDF
F	Ledger	1	1½ × 3½ × length	2 × 4
G	Filler (opt.)	1 or 2	¾ × 3½ × 3½	MDF

How to Build Trimwork Wall Shelves

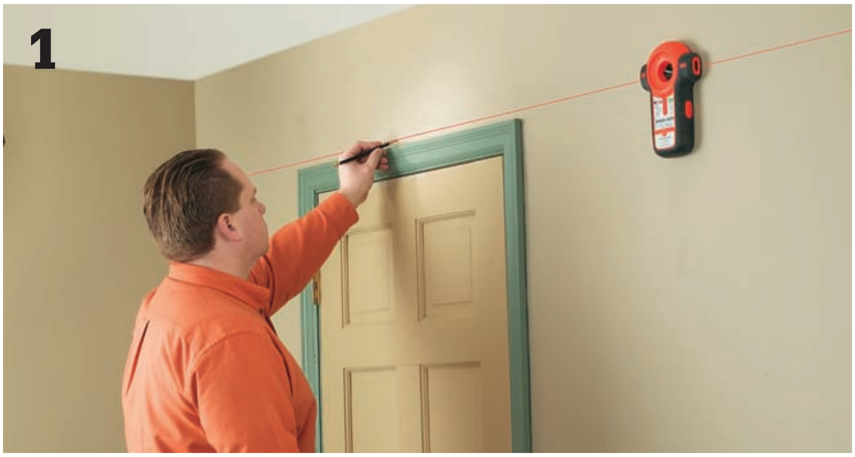
MARK LAYOUT LINES AND INSTALL LEDGER
While you can use a spirit level to create level lines at the specified height across the wall, use a laser level instead if you have access to one (photo 1). There are many types of laser levels on the market and each is operated differently from the others, but all will do a fine job of accurately projecting a line around the room quickly so you can mark it on the wall. Some, such as a rotating laser level, allow you to use the light beam cast by the laser level as the reference, so you don't need to make marks on the walls.

If you plan to install your shelving flush with the tops of your door or window casing and you find that they are not level but are close to level (say, within ¼"), use the highest opening as the control point for your layout and fill the gap that'll be created over the other windows with caulk.

Select a straight 2 × 4 and cut it to length. Use an electronic stud finder to locate wall studs in the installation area, and mark the wall studs just below the level line. Choose high quality, 4"-long screws for attaching the ledger: either use tempered hex-head deck screws or square drive multipurpose cabinet screws. Apply panel adhesive to the back of the ledger and position it so the bottom edge falls just above the level line and the ends are in the correct spot. Drive a pair of screws through the ledger and into the wall studs at each stud location (photo 2). These screws don't normally require a pilot hole.

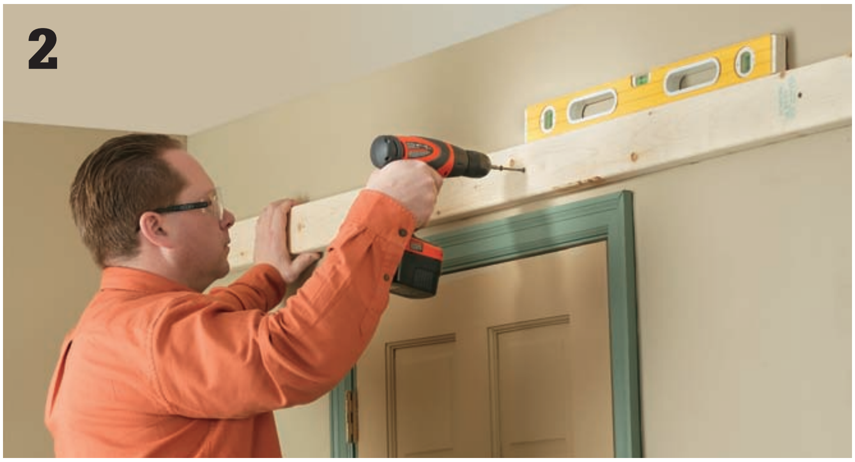
How to Build a Crown Molding Shelf

1

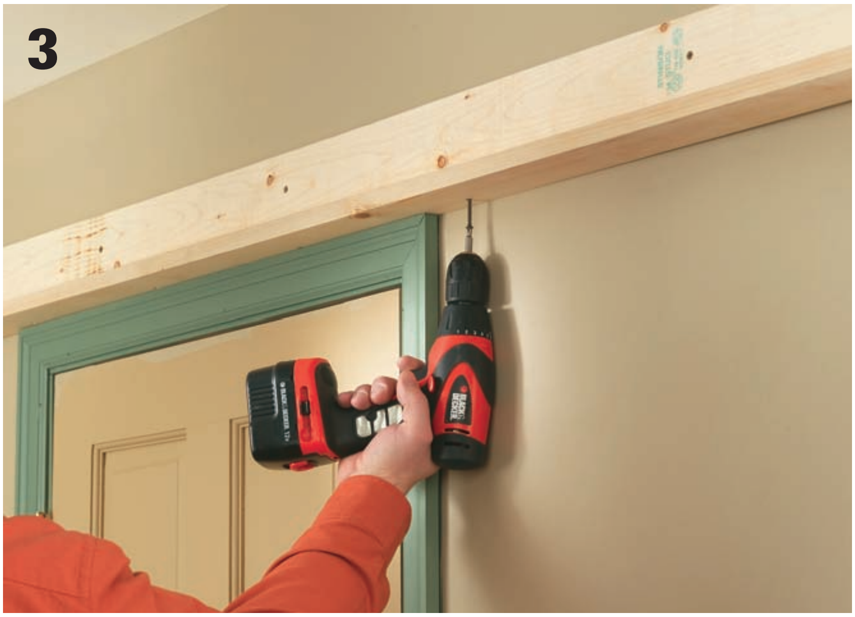


Use a laser level to create a level reference line for the shelf ledger installation. Mark the location of the bottom edge of the ledger, making sure to allow room for the bottom panel above the door trim and for the full height of the finished project.

2

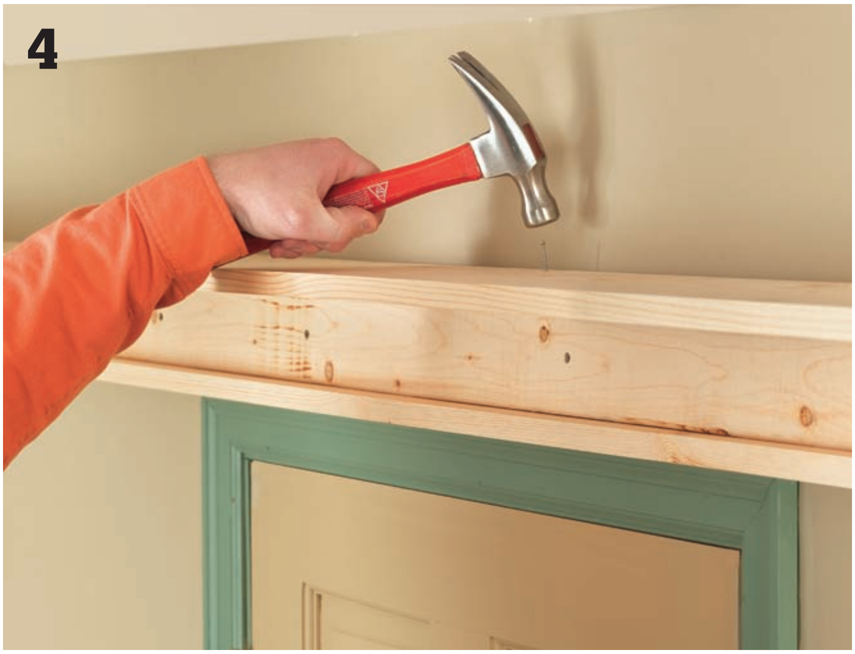


Attach the ledger to the wall studs with 4" cabinet screws and panel adhesive. Double-check to make sure the ledger is level after you drive the first screw.



3

Attach the bottom strip to the ledger board with panel adhesive and wood screws driven into counterbored pilot holes.



4

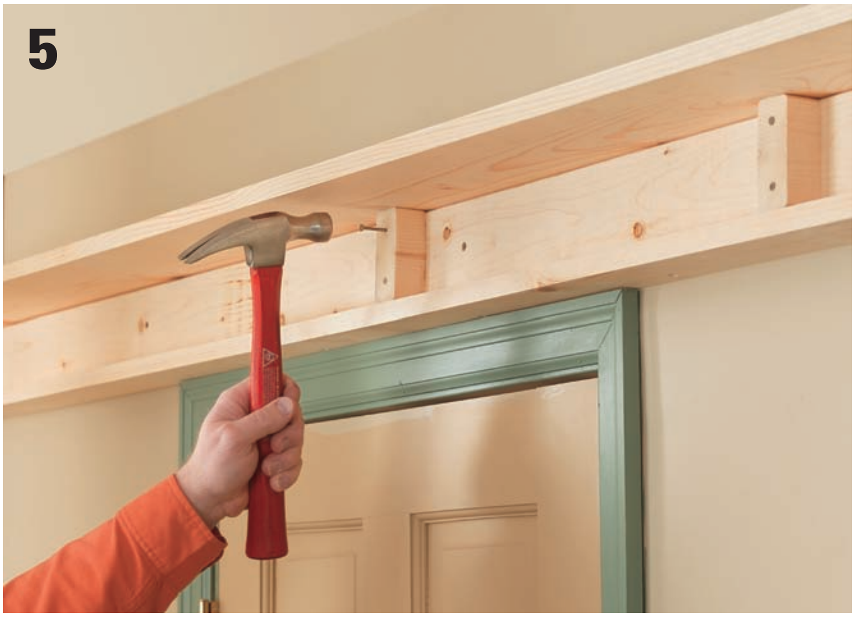
Attach the shelf to the top of the ledger, making sure the ends are flush with the ends of the bottom strip.

BUILD A CROWN-MOLDING SHELF

We designed this crown-molding based shelf to be proportional to the same size and shape molding that already existed at the ceiling in our installation room (3/4" × 4 1/4" crown). Install molding pieces from the bottom and work your way up. If you're wrapping a room, do "laps" with each layer of trim. Rip oak stock for the bottom panel to width (2 3/4" as seen here) and cut it to length. Finish sand all oak parts to 150 grit before installing the parts. On the bottom strip, drill a counterbored pilot hole every 12", located in a line 3/4" in from the back edge of the strip. Attach the bottom strip to the ledger with panel adhesive and 2 3/4" flathead wood screws (photo 3).

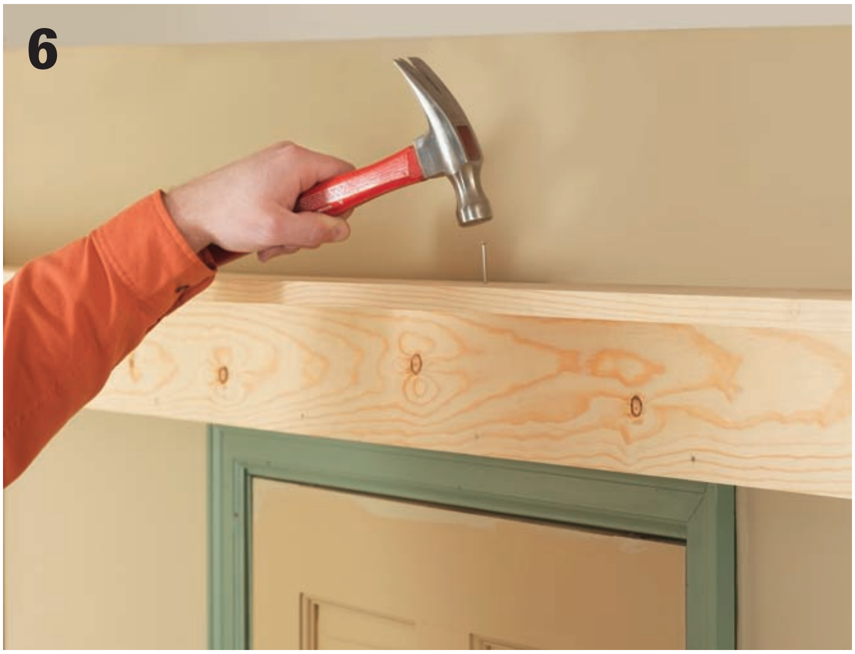
Next, rip and crosscut the top panel to width and length and then attach it to the top of the ledger with panel adhesive and 6d finish nails (photo 4). The ends should be flush with the bottom strip ends,

5



Attach wood spacers to the front face of the ledger to align the front panel when it is pressed against the spacers.

6



Attach the front panel by nailing it to the bottom strip first, and then driving finish nails through the top panel.

and the top panel should be butted cleanly against the wall.

Measure the distance from the front face of the ledger to the front edge of the bottom strip and cut a few spacers to this length from scrap. Attach the spacers to the face of the ledger at several spots along the length of the ledger (photo 5). These spacers will ensure that the front panel is vertical when it is positioned against the spacers.

Rip and crosscut the front panel to width and length, press it against the spacers so the top edge is flush against the underside of the top panel and all ends are aligned. Install the front panel by driving 6d finish nails through the front panel and into the edge of the bottom strip (photo 6). You also may nail at the spacer locations if you wish. Also drive nails through the top panel and into the top edge of the front panel. Set the nail heads with a nail set.

Finally, nail the crown molding in place at 12" intervals.

Cut the crown molding to length. If your shelf has one or more open ends or occupies more than one wall, see the material on making a crown molding return (pages 42 to 43). Fit the molding between the bottom of the top panel and the top of the bottom strip, making sure the flat ends of the molding are flush against the surfaces. Drill pilot holes and drive nails at 12" intervals through the molding and into the top and bottom strips (photo 7).

Cover nail and screw heads with wood putty and then sand and finish the shelf, matching the other room trim if possible.

How to Build a Stepped Shelf

Attach the 2 × 4 ledger or ledger to the wall at your installation lines, using cabinet screws and panel adhesive.

This variation of the trimwork wall shelf idea uses face-glued strips of MDF to create a stepped-down waterfall effect. While you can certainly build the whole project piece-by-piece, you'll be able to do faster, more accurate work if you can preassemble the three stepped down strips on your worksurface. If you are adding a return on the shelf, as we do here, pre-assemble the strips for the long wall only, then cut each strip for the mating section to length and butt them up against their counterpart on the first section of shelving.

Lay out and install the ledger or ledgers as shown for the previous crown molding project. Make a simple butt joint in the corner (photo 1). If the return shelf is short, you can strengthen the ledger by driving a couple of screws through the long ledger and into the end of the return ledger.

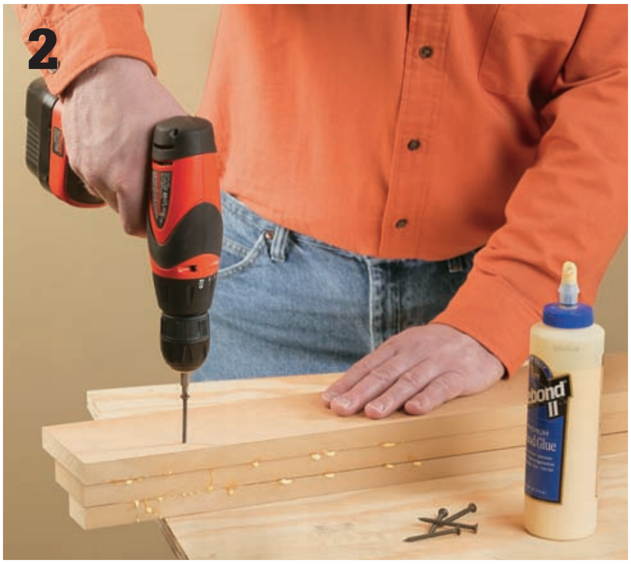
Attach the top and bottom strips as shown in steps D and E of the crown shelf molding project. Then rip stock for the three step strips to width (1½", 3" and 4½"). Cut the strips slightly too long and then glue them together on your worksurface, making sure the tops are flush. Drive some 2" wallboard screws through the back face of the tall strip and into the two shorter strips to draw them together (photo 2).

After the glue-up dries, cut the glue-up assembly to final length. Trim both ends to make sure the ends are aligned. Then, attach some spacers to the front face of the ledger and attach the three-strip glue-up by driving screws through the assembly and into the front edge of the bottom panel (photo 3). Also drive screws through the top panel and into the tops of the glued-up strips.

Attach the top and bottom strip for the return shelf. Make the top long enough to overhang the end of the return, if visible, by 1". Butt the ends of the top and bottom strips up against the top and bottom strips already mounted on the wall. Then, measure for each of the three stepped strips, measuring from the mating edge of its counterpart on the wall to the end of the return (each successive strip will be approximately 3⁄4" longer working from top to bottom). Install the tall strip first, and then attach the shorter ones in succession using glue and screws (photo 4).

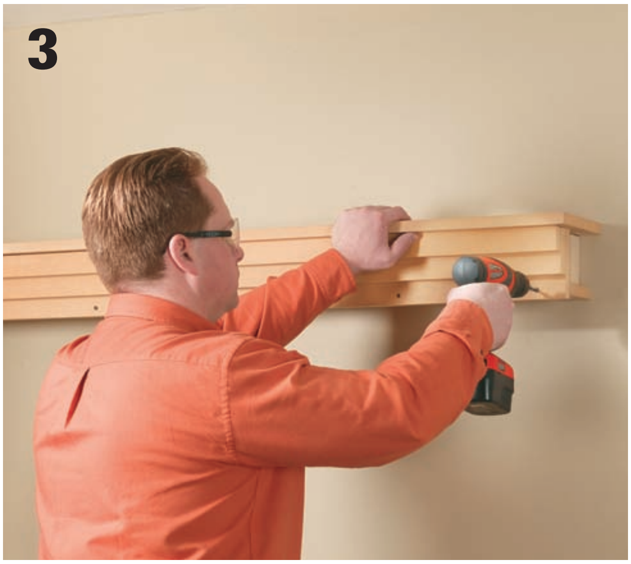
If the return has an exposed end, measure the opening between the ledger and the shelf front and cut a filler piece to fit (in this project, the piece was 2" wide and 3½" tall. Glue and nail the filler into the opening. Then, cover nail and screw heads with wood filler, caulk any gaps between the project and the wall (photo 5), and then sand, prime and paint the project.

2



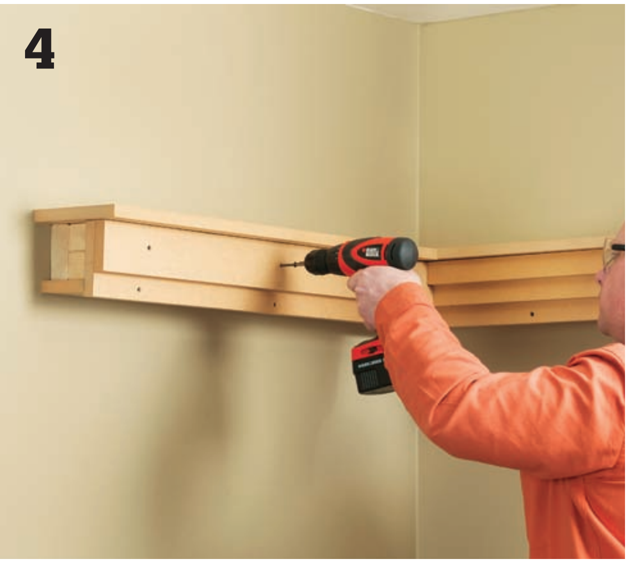
On a flat worksurface, join the three stepped strips together to create strong joints and simplify assembly of the shelf.

3



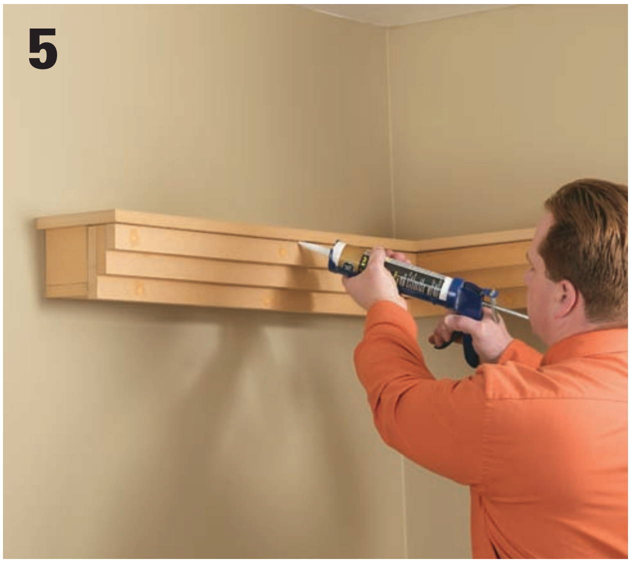
Attach the stepped strips to the top and bottom strips mounted on the ledger.

4



Cut each stepped strip individually to butt up against the mating strip in the corner and fasten with wallboard screws.

5



Caulk gaps and fill nail and screw holes before sanding and painting your shelf project.

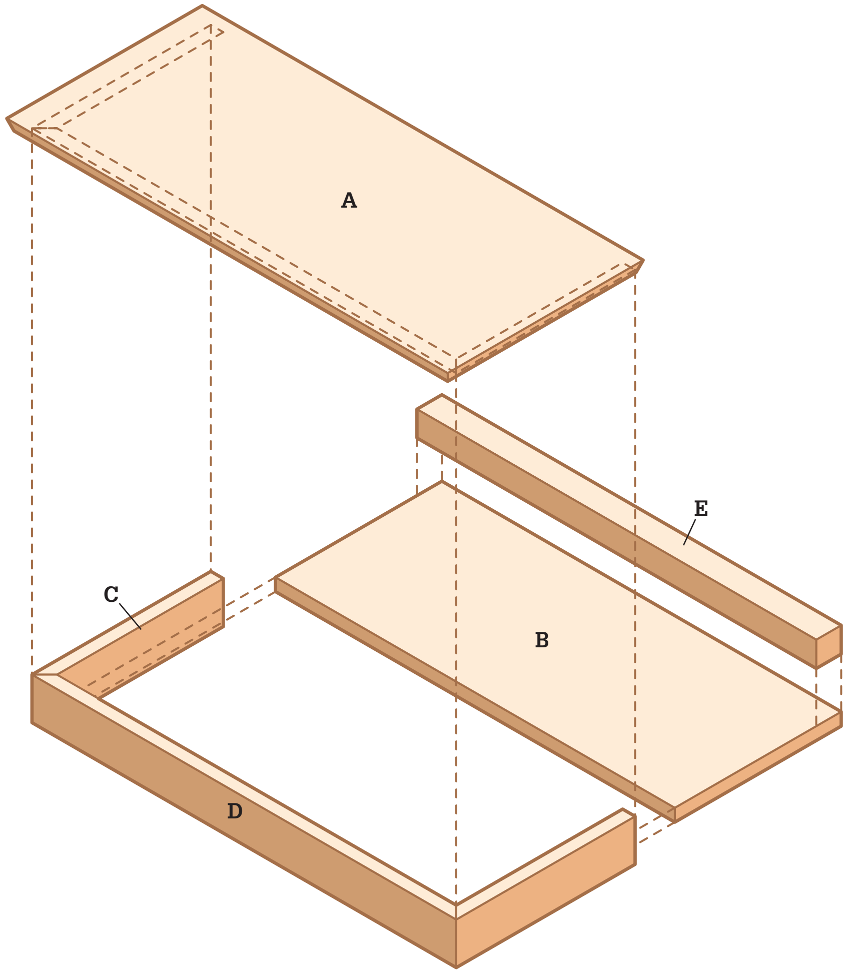
Box Beam Shelves

If you're looking for a basic starter project that you can finish with your own flourishes and flair, you've come to the right place. This shelf is made from a basic design platform that looks great as is, but it can be easily altered with trim and finish options. In addition to its versatility, this shelf has the benefit that its connection to the wall surface is invisible. The reason is that the "box" has no back and you can slip it over a ledger board fastened to the wall. Fastening through the top of the box holds the assembly securely in place without brackets or even any visible fasteners, creating a tight, integrated look.

As a design element in any living space you can make several Box Beam Shelves and hang them at different heights in a room to create an accent wall. Or, hang several of them at the same level and create a picture rail, of sorts. They're perfect for displaying cherished items and an ideal spot for long, flowing potted plants. Another possibility is to dado in a plate groove for displaying plates and china.

If you want to change the size, shape, and reveals on the basic box you can add different moldings and trim to make it your own. The good news is that the assembly techniques for building the box remain the same. All you need to do is adjust the measurements.

The shelf laid out here is fabricated from MDF and shown painted, but you could make it out of hardwood stock and matching hardwood plywood if you prefer. The basic shelf-box is composed of five pieces: three sides, a bottom, and a top. The shelf is 25½" wide, 10¾" deep, and 3¼" tall. The top shelf panel is a single piece of ¾" MDF that is 26½" wide and 11¾" deep. The ledger is a 2× ripped 1½" square.



Tools

Table saw
Miter saw
Circular saw
Router
Ladder
Level
Cordless drill/driver
Sander or power planer

Materials

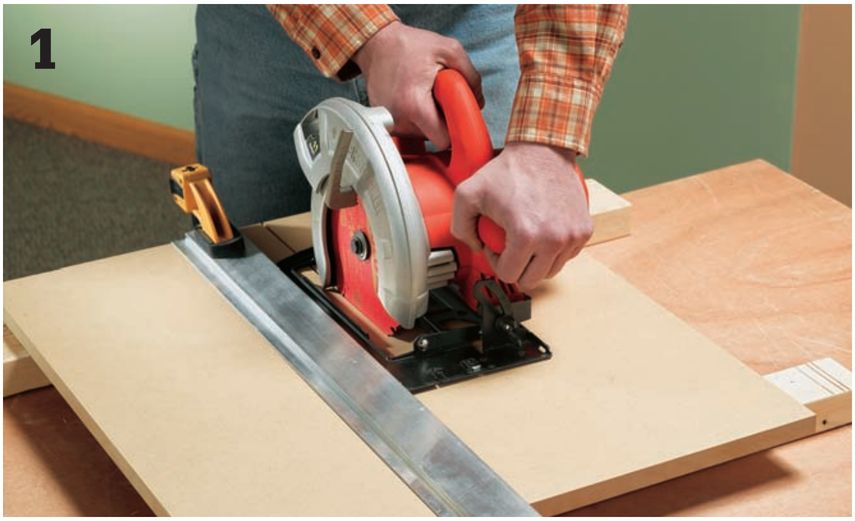
¾" MDF
Fasteners
1) 2 × 4 scrap (at least 24")
1) tube adhesive caulk
1) scrap of ¼" plywood

Cutting List

Part	No.	Desc.	Size	Material
A	1	Top panel	¾ × 11¾ × 26½"	MDF
B	1	Bottom panel	¾ × 10 × 24"	MDF
C	2	Side wraps	¾ × 2½ × 10¾"	MDF
D	1	Front wrap	¾ × 2½ × 25½"	MDF
E	1	Cleat	1½ × 1½ × 23¾"	2 × 4 (or 2 × 2)

How to Build Box Beam Shelves

1



Most power miter saws do not have a 10" cutting capacity. To cut the wide stock for this project, you can either make a portion of the cut on the miter saw then turn the board around so you can finish the cut, or use a circular saw and square-guide.

2

BLACK & DECKER

The key to a durable, good-looking assembly is to cut the sides and the front strips that wrap the bottom panel bottom panel accurately. Careful measurement and cutting keeps the miter joints tight and together during assembly.

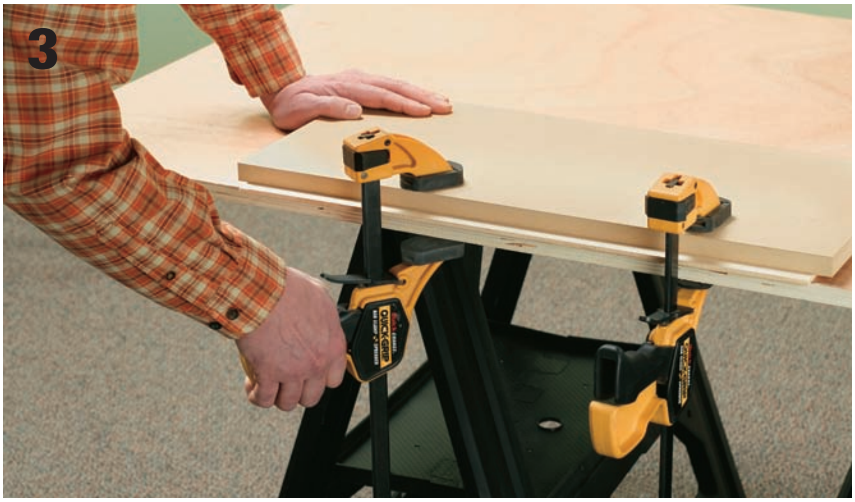
CUT THE PARTS

The first step is to cut all the pieces on the miter and table saw. If you need to, rough-cut the MDF sheet to size using a circular saw, but make the final cuts with the miter saw and table saw. Start by fabricating the shelf's bottom panel. Then, make the pieces for a three-sided (or C-Shaped) shelf box. The pieces will be assembled around the bottom panel. Cut the top-shelf panel. Finally, rip the ledger from a piece of 2× stock. This assembly works best if cutting tolerances are kept tight, so be extra careful with measuring, marking, and cutting.

Cut the bottom panel to size using a sliding power miter saw (or a circular saw and straightedge guide if your miter saw doesn't have a 10" cut capacity–photo 1), or a table saw. Because the sides and front wrap around the bottom panel, it is the control point for the rest of the layout. Cutting it accurately is important. Be careful to be as exact as you can while cutting. Cut stock for the shelf sides (called the panel wraps) to 2½" width and sand, joint, or plane out any saw marks left behind. Also cut the top panel to size.

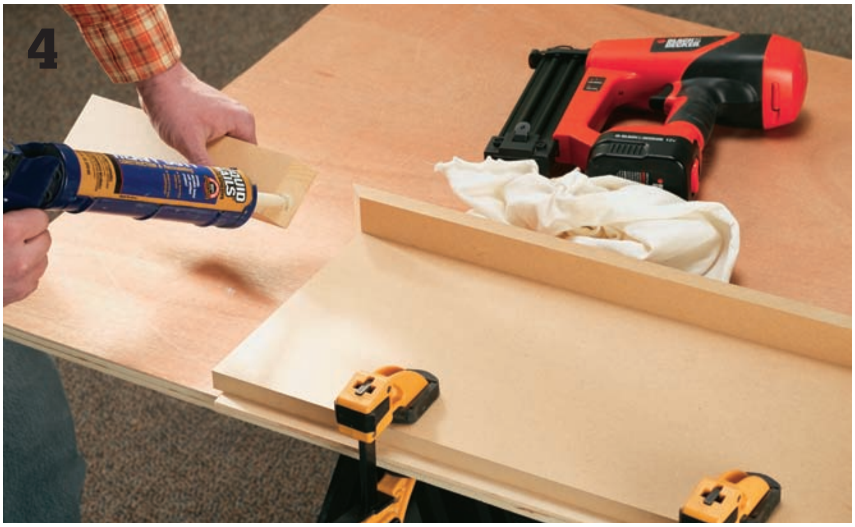
Rip the ledger to width (1½") and cross-cut it to length. Cut the panel wraps to length using the miter saw (photo 2).

3



Clamp the bottom panel to the bench to keep it stationary while you fasten the panel wraps around it, enabling you to focus your attention on getting the assembly tight.

4



Prior to installing the front panel wrap to the left panel wrap, dab each miter with adhesive caulk.

ASSEMBLE THE PARTS

Assembling the parts square and tight all starts with the bottom panel—it's the guide for getting the miters nice and tight. For fastening, a cordless drill and trim drive screws (pre-drill and countersink all holes) is great. A brad nailer or finish nailer will also work nicely. Should you use a pneumatic tool like this, make sure to drive fasteners straight into the stock. Nails driven at an angle can blow out of the material and are tough to remove.

A good trick for adding shadow lines is to inset the bottom into the panel wraps about ¼". Do this by first screwing a scrap of ¼" plywood (cut just a little smaller than the bottom panel's dimensions) on the bench then clamping the bottom panel over it, propping it up (photo 3). Follow up by wrapping the bottom panel with the panel wraps.

Fasten the left panel wrap to the bottom panel. Use the front panel wrap to guide your exact placement of the left panel wrap. In other words, match up the miters on the front and left panel wraps, then fasten the left panel wrap. Apply adhesive caulk to the left panel wrap miter and the left side miter on the front panel wrap (photo 4), then install the front panel wrap. Make sure to have a damp cloth or sponge to wipe away any squeeze-out. Repeat this process for the right panel wrap and install. Only fasten the bottom edge.

Use a router and profiling bit to shape a decorative edge along the front of the top panel (photo 5). Attach the top piece to the box frame. Before fastening, use a combination square and double-check that all reveals are the same (photo 6).

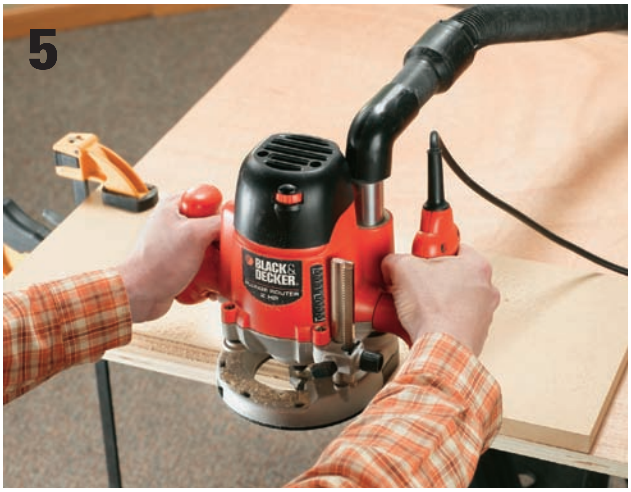
CAULK & FINISH

It's easier to caulk and paint this project in the shop than it is on the wall. Caulk, prime, and paint as desired. A small paint roller sleeve will give a smooth, professional finish (photo 7).

HANG THE SHELF

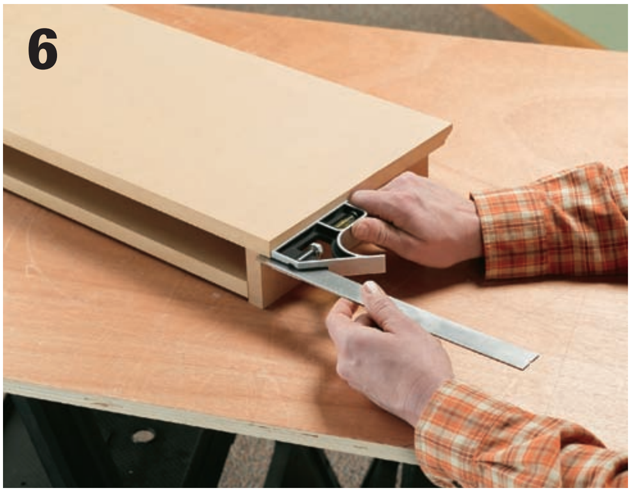
Installing the Box Beam Shelf on the wall ledger provides an invisible connection. The open back of the shelf slips over a ledger board you fasten to the wall studs. You then drive screws through the shelf panel down into the ledger for a very snug, very secure connection. It may be tempting on some walls to simply use hollow-wall anchors instead of locating and fastening to two studs, but because all the weight of the Box Beam Shelf is out at the front edge, that is not a recommended connection. Besides, at 24" long, the ledger for the Box Beam Shelf should cover at least

5



Cut a decorative profile along the front edge of the top panel, such as the ogee profile being routed into the top panel here.

6

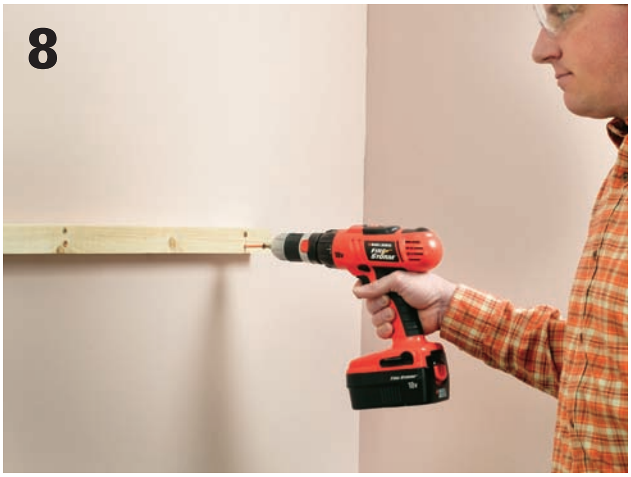


Before fastening the top panel on top of the box frame, make sure that the reveals are equal all the way around and that the back is flush to the back edge of the box assembly.

7

Finishing this Box Beam Shelf in the shop is much easier than finishing it in location. Prop it up on its back edge during finishing so you can access the top, sides, and bottom with a paint brush. Be careful not to knock it over.

8



Make a solid connection with the studs by driving two screws per stud through the ledger. If the stud is near the end of the ledger, pre-drill and countersink before fastening.

two wall studs almost anywhere you put it (especially if your walls have 16 o.c. framing).

Determine the shelf's final location and mark it on the wall. Try to locate it so that the ledger falls over two wall framing members. Strike a level line. Screw the ledger to the wall studs with 3½" deck screws (photo 8). Use two screws per stud.

Predrill countersunk pilot holes for at least three deck screws ¾" in from the back edge of the top panel. Slip the Box Beam Shelf over the ledger so the back edges are flush against the wall surface. Fasten the shelf to the wall by driving 2" deck screws through the pilot holes and into the top of the ledger (photo 9).

9

Hold the shelf tight to the wall and fasten using at least three 2" deck screws driven through pilot holes and into the tops of the ledger.

"Other Ideas" ▸

One great feature about this shelf design is the numerous ways you can add your own details to it. You can use your table saw to cut in a plate groove in the top shelf panel or apply a molding detail with casing, chair rail or crown under the top shelf panel to provide lift, create texture and add shadow lines. You can add a second top shelf panel a littler larger than the first to create a layered effect. And you can wrap the back with a picture-frame molding. The sky is the limit.

You need to alter the sizes of the shelf box and the top shelf to fit these additions so lay them out carefully before you begin cutting wood. But, because the ledger board connection is strong but small, there is room to move. Here are some ideas to get you started:

PLATE GROOVE

Adding a plate groove is easy and a smart addition if you plan to display plates or other items like framed photos that you intend to lean on the wall. You can cut the grooves in a single pass on your table saw using a dado head cutter, or you can take multiple passes with a standard saw blade to create the groove. Make the groove ¼" to ⅜" wide and ¼" deep. You can even use a router and edge guide to plow a dado into the top of the shelf panel. Tip: When cutting the groove, do not cut all the way up to the ends of the board. That way, the groove will be invisible when viewed from below or straight on. If you cut past the shelf ends you'll be able to see the groove.

MOLDING DETAIL

Adding a basic chair rail molding is the easiest add-on option for the Box Beam Shelf. Depending on the chair rail you choose, you may not even have to alter the measurements on the shelf box, and you can apply the chair rail right to the box. However, if you select a molding that is more than ¾" thick, trim the box size by ¾" so you can keep the top shelf panel's 1" overhang. If you add a molding that's 1" thick or thicker, make the sides of the box 1" shorter and 1" thinner to compensate.

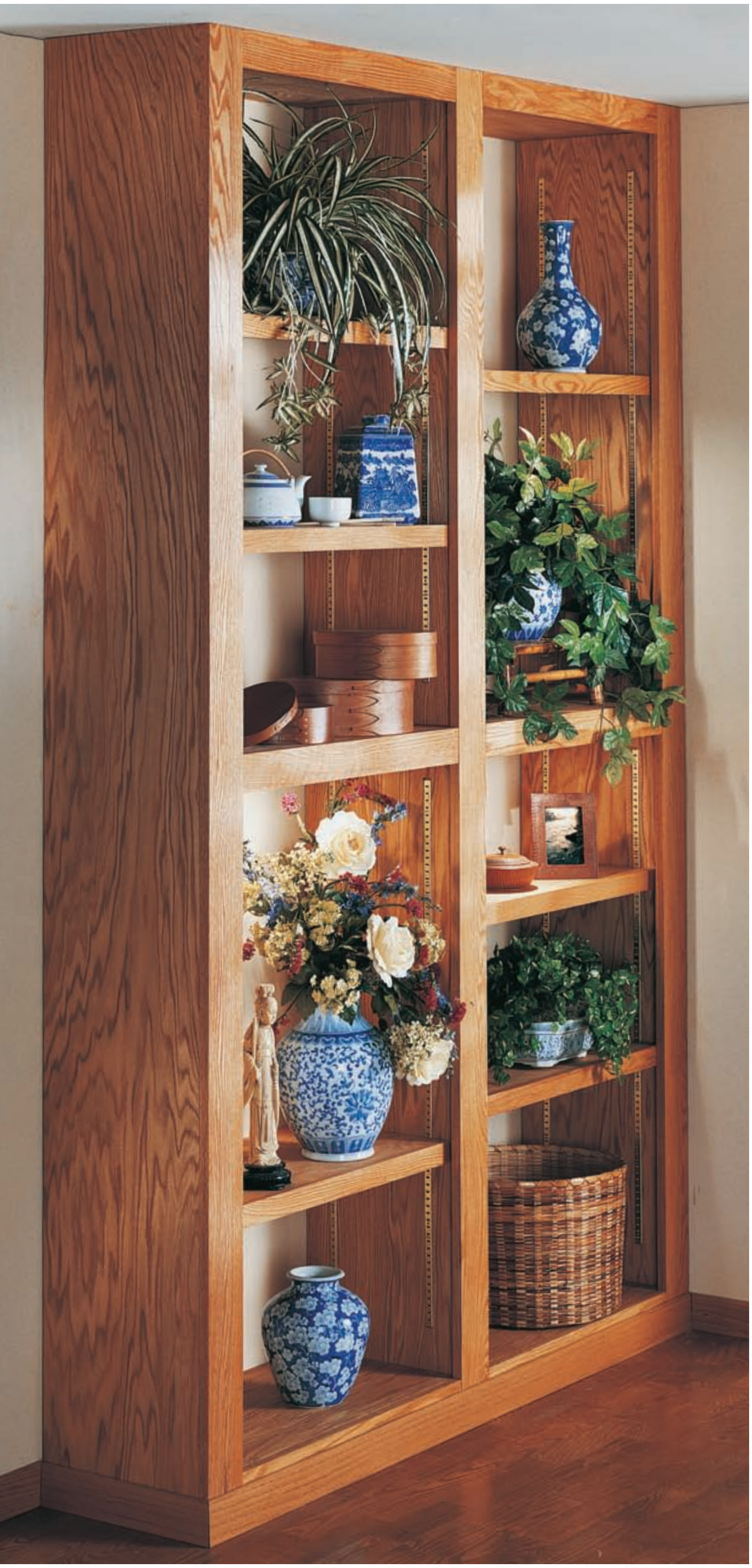
LAYERS

Using two—instead of one—top shelf panels is another simple but interesting way to add detail. Make the second top shelf panel ½" deeper and 1" longer than the original shelf panel shown above. Then, instead of routing a bead on the top of the panel, rout a chamfer on the bottom of each shelf panel to make them look like they are stepped and ascending. Routing a cove is also a nice detail.

PICTURE FRAME

Whichever shelf you build, you can add a picture frame molding to the back of the unit to make the unit look like it is an extension of the wall space. The idea is to use 1 × 4 or MDF ripped to width and wrap the back of the Box Beam Shelf with it. Install the shelf box without the top shelf panel and fasten into the ledger board from the sides. Install the picture frame molding before installing the top shelf panel or any other molding combinations. Also be aware that the picture frame molding adds ¾" to the overall depth of the shelf so you may want to trim a corresponding ¾" off your top shelf panels.

Floor-to-Ceiling Shelves

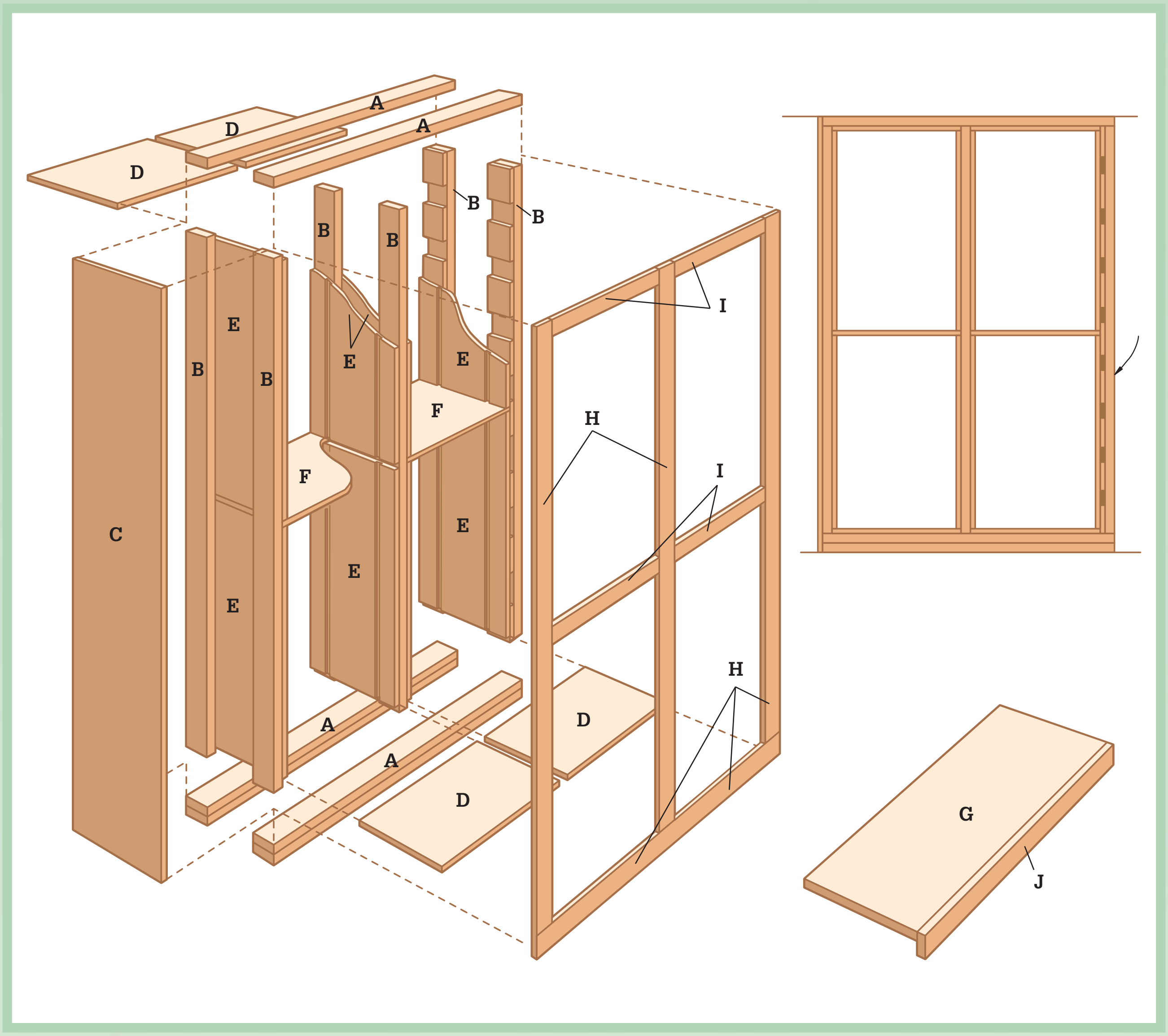


Floor-to-ceiling shelves are sturdier and make better use of space than freestanding bookcases. When finished and trimmed to match the surrounding room, floor-to-ceiling shelves turn an ordinary room into an inviting den or library.

This project uses finish-grade oak plywood and a solid oak face frame to create the look of an expensive, solid oak shelf unit at a fraction of the cost. The plywood panels are supported and strengthened by an internal framework of 2 × 4 stud lumber.

When installing floor-to-ceiling shelves in a corner, as shown here, add ½" plywood spacers to the support studs that adjoin the wall. Spacers ensure that face frame stiles of equal width can be installed at both shelf ends (see diagram, page opposite).

Although it is similar in some fashions to the formal bookcase project featured on pages 188 to 193, this more casual version utilizes somewhat different building techniques and has a more contemporary/casual appearance. The end panels and standards are made from relatively inexpensive plywood with a rotary-cut red oak veneer that has a medium oak finish. If this highly recognizable look doesn't quite fit in with your décor, simply use plywood with a different outer veneer, such as maple or birch or walnut, and either leave the wood uncolored or give it a dark stain. Or, you can build the project from paint-grade plywood and finish it with a lively color.



Tools

- Tape measure
- Pencil
- Level
- Framing square
- Plumb bob
- Drill with drive bits
- Hammer
- Circular saw
- Router
- ¾" straight bit

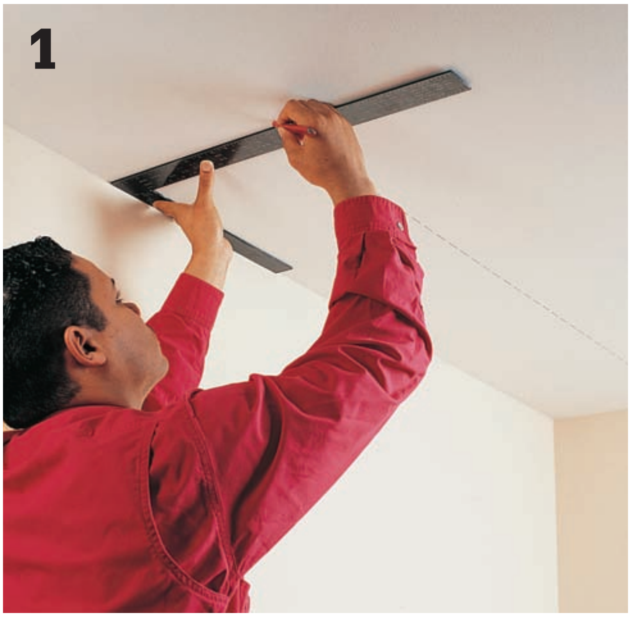
Materials

- (12) 2 × 4 × 8 pine
- (3) ½ × 4 × 8 oak plywood
- (2) ¾ × 4 × 8 oak plywood
- (3) 1 × 4 × 10 ft. oak
- (1) 1 × 3 × 10 ft. oak
- Finish nails (1½", 2")
- Drywall or deck screws (1¾", 2", 3")
- Shims
- Metal shelf standards and clips
- Finishing materials
- ½" plywood scraps
- Carpenter's glue

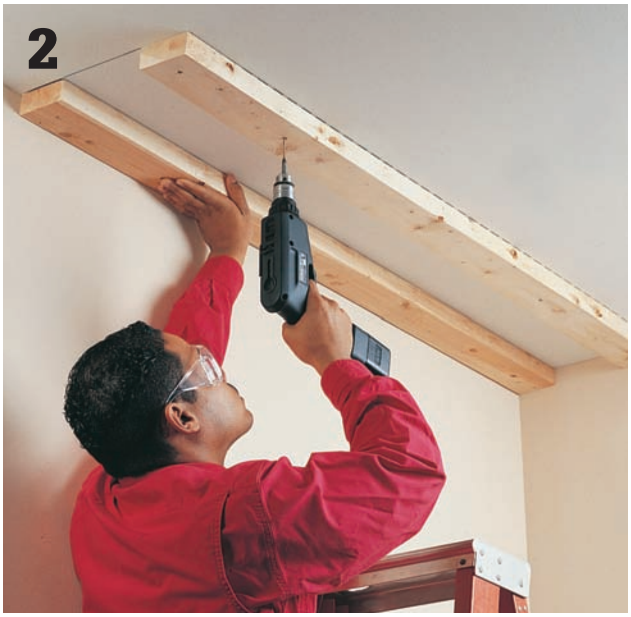
Cutting List

Part	No.	Desc.	Size	Material
A	6	Top and sole plates	59½"	2 × 4s
B	6	Support studs	91½"	2 × 4s
C	1	End panel	95¾ × 13"	½" oak plywood
D	4	Top, bottom panels	27¼ × 13"	½" oak plywood
E	8	Risers	44⅞ × 13"	½" oak plywood
F	2	Permanent shelves	27¼ × 13"	¾" oak plywood
G	8	Adjustable shelves	26⅛ × 11⅞"	¾" oak plywood
H		Stiles and bottom rail	28 lineal ft.	1 × 4 oak
I		Top rail, middle rail	10 lineal ft.	1 × 3 oak
J		Shelf edging	18 lineal ft.	1 × 2 oak

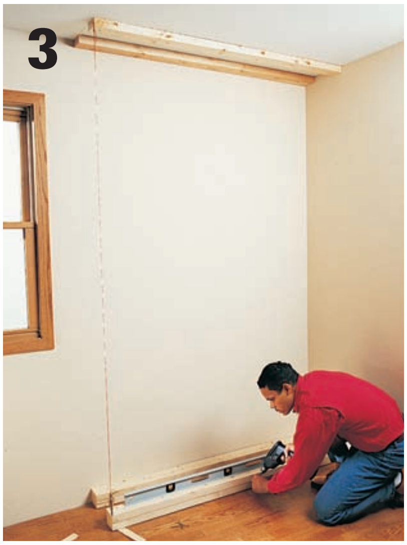
How to Build Floor-to-Ceiling Shelves



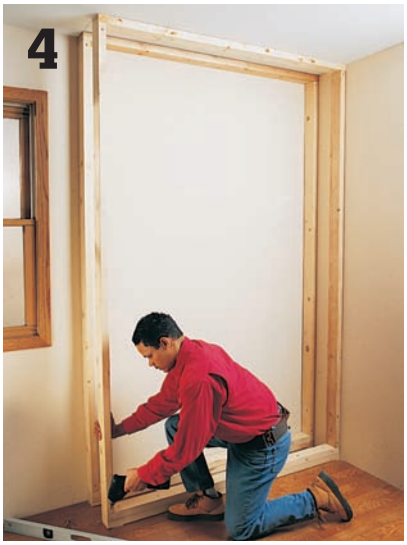
Mark the location for two parallel 2 × 4 top plates on the ceiling, using a framing square as a guide. The front edge of the outer top plate should be 13" from the back wall, and the other top plate should be flush against the wall. Mark the location of the ceiling joists; if necessary, install blocking between joists to provide a surface for anchoring the top plates.



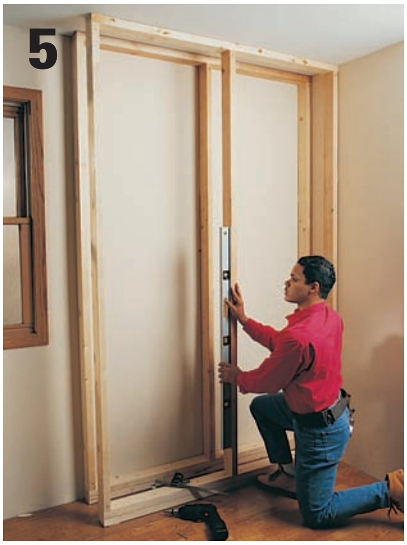
Measure and cut the 2 × 4 top plates. Position each plate, check to make sure it is level, and install shims if necessary. Attach the plates to the ceiling with 3" screws driven into the joists or blocking.



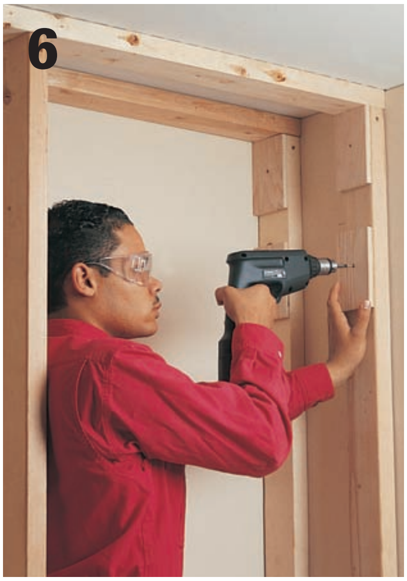
Cut 2 × 4 sole plates and screw them together to form two doubled sole plates. Use a plumb bob suspended from the outside corners of the top plates to align the sole plates. Shim the plates to level, if needed. Anchor the plates by driving 3" screws toenail-style into the floor.



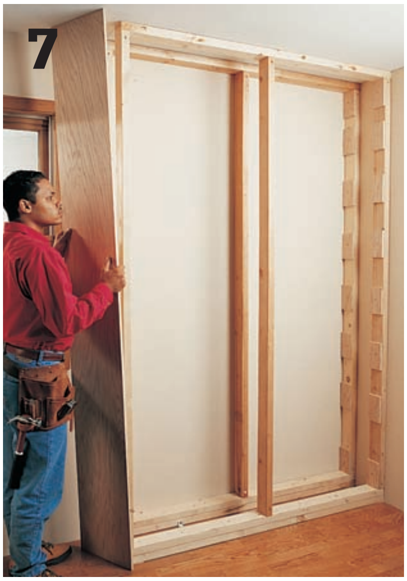
Install 2 × 4 support studs between the ends of the top plates and sole plates. Attach support studs with 3" screws driven toenail-style into the top plates and sole plates.



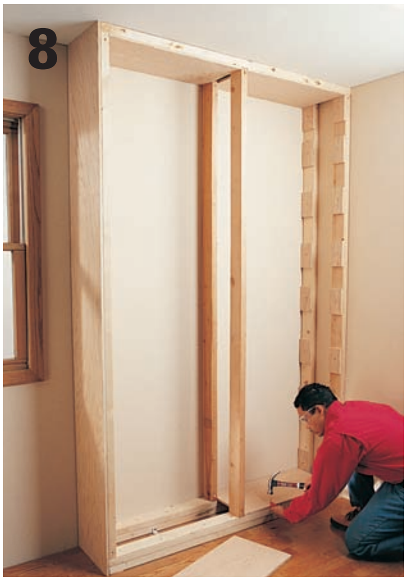
Install the center support studs midway between the end support studs. Attach them to the bottom plate first, using 3" screws driven toenail-style. Use a level to make sure that each stud is plumb, then attach the studs to the top plate with 3" screws.



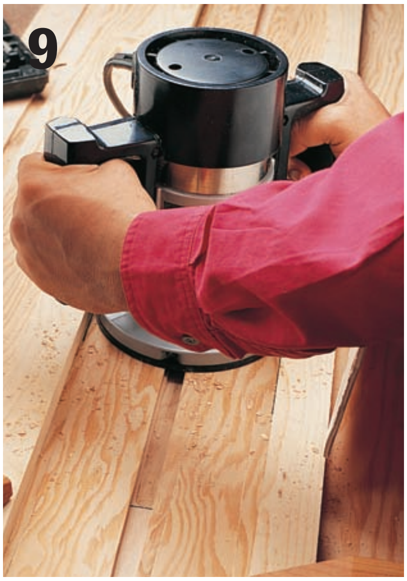
Where the shelves fit into a corner, use 1⅝" screws to attach ½" plywood spacers on the inside faces of the support studs, spaced every 4". Make sure spacers do not extend past the front face of the studs.



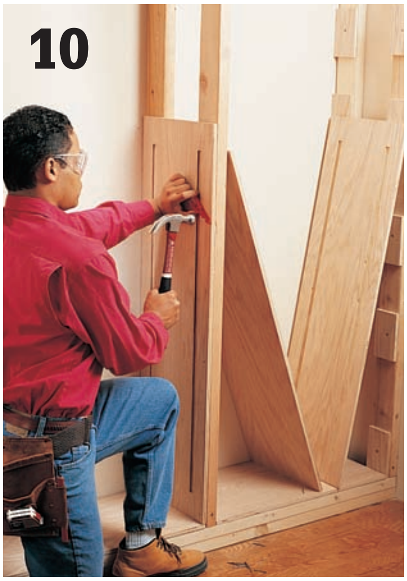
Where the end of the project is exposed, measure and cut a ½" plywood end panel to floor-to-ceiling height. Attach the panel to the support studs so the front edges are flush, using 1¾" screws driven through the support studs and into the end panel.



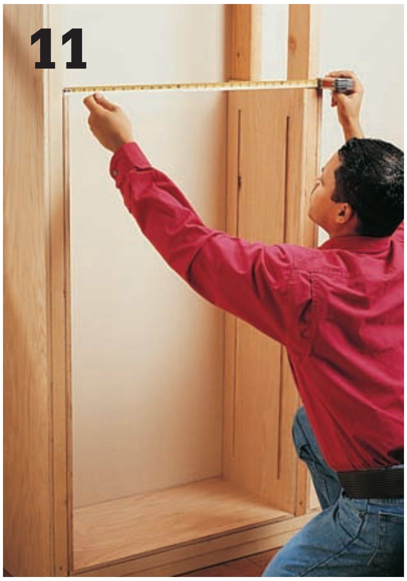
Measure and cut ½" plywood top and bottom panels to fit between the support studs. Attach to the top and sole plates using 1½" finish nails.



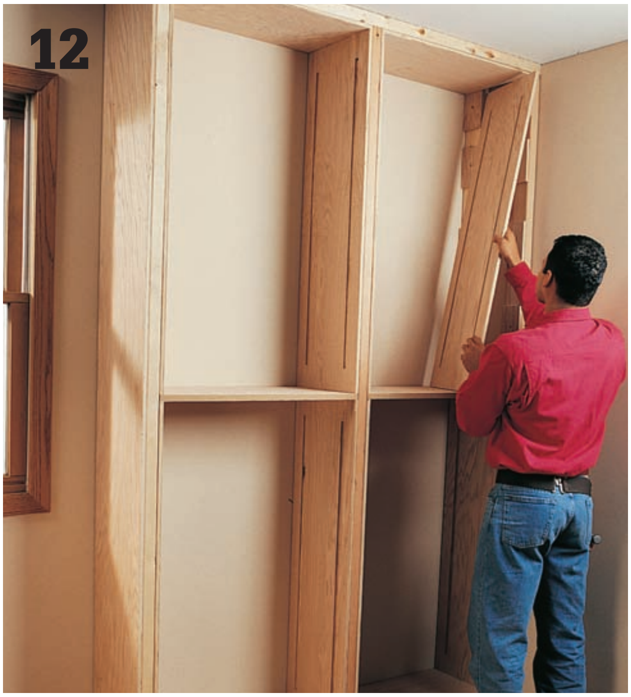
Measure and cut lower risers from ½" plywood, then cut dadoes for metal shelf standards using an edge guide (page 41).



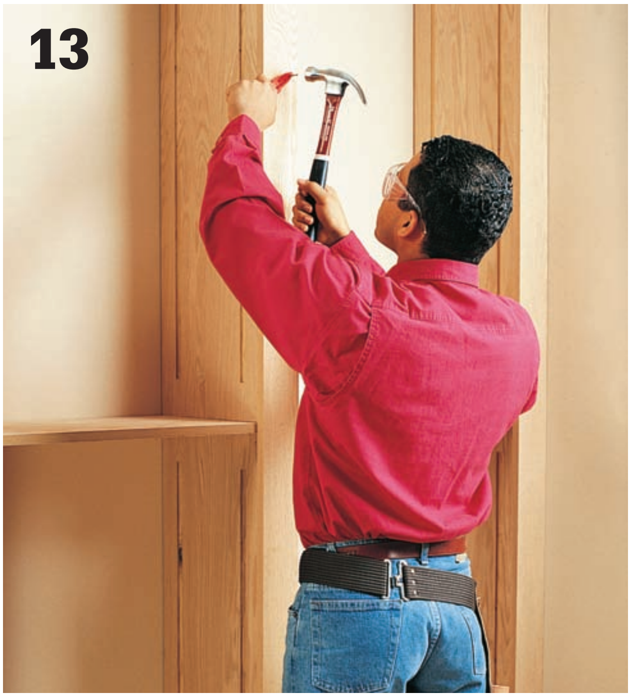
Install lower risers on each side of the 2 × 4 support studs so the front edges are flush with the edges of the studs. Attach risers with 1½" finish nails driven into the support studs. For risers that adjoin the wall, drive nails at spacer locations.



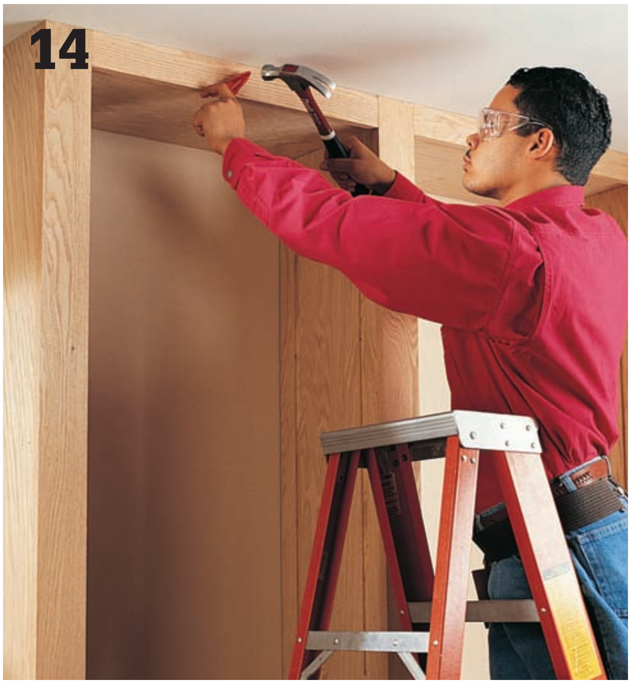
Measure and cut permanent shelves from ¾" plywood to fit between the support studs, just above the lower risers. Set the shelves on the risers and attach them with 1½" finish nails driven down into the risers.



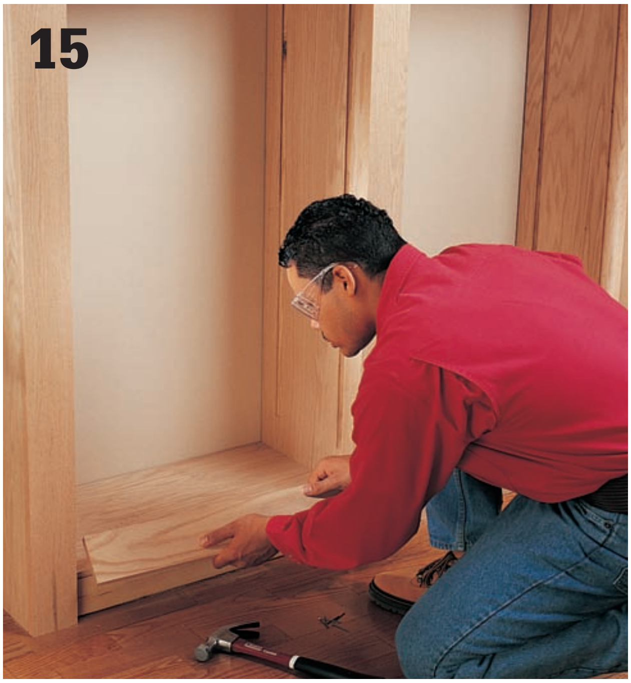
Measure and cut upper risers to fit between the permanent shelves and the top panels. Cut dadoes for metal shelf standards, then attach the risers to the support studs with 1½" finish nails.



Measure and cut 1 × 3 stiles to reach from floor to ceiling along the front edges of the exposed support studs. Drill pilot holes and attach the stiles to the support studs so they are flush with the risers, using glue and 1½" finish nails driven at 8" intervals.

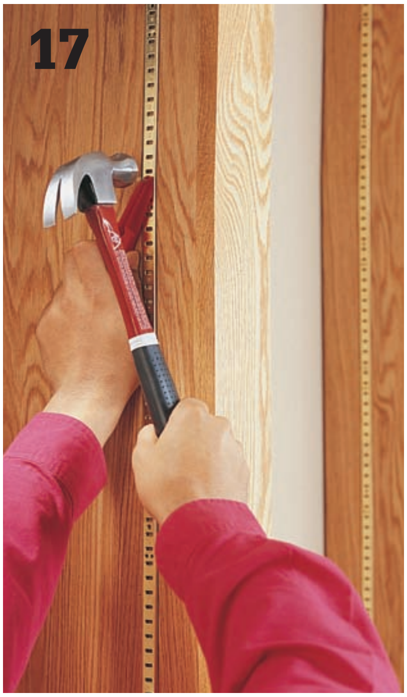


Measure and cut 1 × 3 top rails to fit between the stiles. Drill pilot holes and attach the rails to the top plate and top panels, using carpenter's glue and 1½" finish nails.

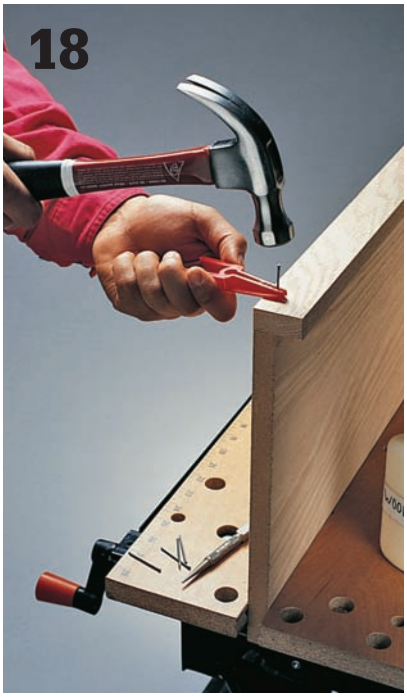


Measure and cut 1 × 4 bottom rails to fit between the stiles. Drill pilot holes, and attach the rails to the sole plates and bottom panels, using glue and 1½" finish nails. The top edge of the rails should be flush with the top surface of the plywood panels.

Fill nail holes, then sand and finish the wood surfaces.

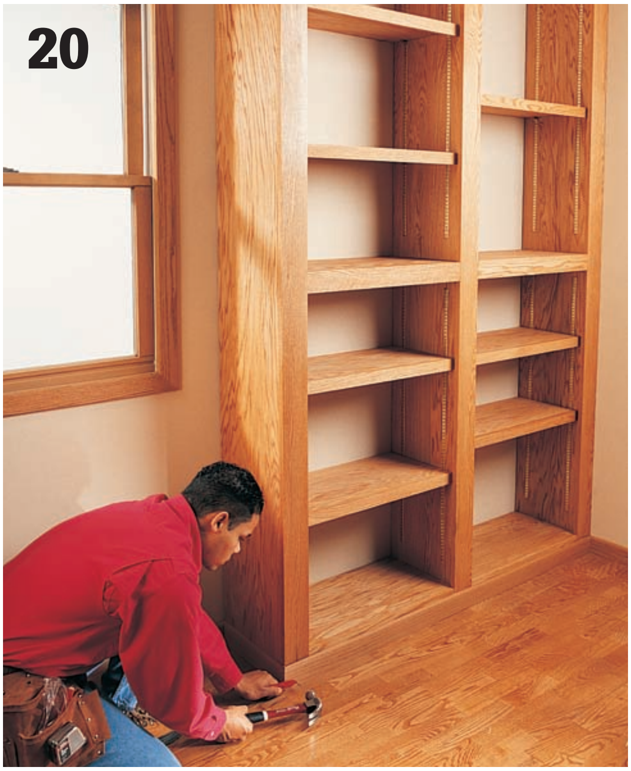


Measure, cut, and install metal shelf standards into the dadoes, using nails or screws provided by the manufacturer.



Measure and cut adjustable shelves ⅛" shorter than the distance between metal standards. Cut shelf edging, and attach it with glue and 1½" finish nails. Sand and finish the shelves.

Insert shelf clips into the metal shelf standards and install the adjustable shelves at desired heights.



Cover gaps between the project and walls and floor with molding that has been finished to match the shelf unit.

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Conversion Charts

Converting Measurements

To Convert:	To:	Multiply by:
Inches	Millimeters	25.4
Inches	Centimeters	2.54
Feet	Meters	0.305
Yards	Meters	0.914
Square inches	Square centimeters	6.45
Square feet	Square meters	0.093
Square yards	Square meters	0.836
Cubic inches	Cubic centimeters	16.4
Cubic feet	Cubic meters	0.0283
Cubic yards	Cubic meters	0.765
Ounces	Milliliters	30.0
Pints (U.S.)	Liters	0.473 (Imp. 0.568)
Quarts (U.S.)	Liters	0.946 (Imp. 1.136)
Gallons (U.S.)	Liters	3.785 (Imp. 4.546)
Ounces	Grams	28.4
Pounds	Kilograms	0.454

To Convert:	To:	Multiply by:
Millimeters	Inches	0.039
Centimeters	Inches	0.394
Meters	Feet	3.28
Meters	Yards	1.09
Square centimeters	Square inches	0.155
Square meters	Square feet	10.8
Square meters	Square yards	1.2
Cubic centimeters	Cubic inches	0.061
Cubic meters	Cubic feet	35.3
Cubic meters	Cubic yards	1.31
Milliliters	Ounces	.033
Liters	Pints (U.S.)	2.114 (Imp. 1.76)
Liters	Quarts (U.S.)	1.057 (Imp. 0.88)
Liters	Gallons (U.S.)	0.264 (Imp. 0.22)
Grams	Ounces	0.035
Kilograms	Pounds	2.2

Lumber Dimensions

Nominal - U.S.	Actual - U.S.	METRIC
1 × 2	¾ × 1½"	19 × 38 mm
1 × 3	¾ × 2½"	19 × 64 mm
1 × 4	¾ × 3½"	19 × 89 mm
1 × 5	¾ × 4½"	19 × 114 mm
1 × 6	¾ × 5½"	19 × 140 mm
1 × 7	¾ × 6¼"	19 × 159 mm
1 × 8	¾ × 7¼"	19 × 184 mm
1 × 10	¾ × 9¼"	19 × 235 mm
1 × 12	¾ × 11¼"	19 × 286 mm
1¼ × 4	1 × 3½"	25 × 89 mm
1¼ × 6	1 × 5½"	25 × 140 mm
1¼ × 8	1 × 7¼"	25 × 184 mm
1¼ × 10	1 × 9¼"	25 × 235 mm
1¼ × 12	1 × 11¼"	25 × 286 mm
1½ × 4	1¼ × 3½"	32 × 89 mm
1½ × 6	1¼ × 5½"	32 × 140 mm
1½ × 8	1¼ × 7¼"	32 × 184 mm
1½ × 10	1¼ × 9¼"	32 × 235 mm
1½ × 12	1¼ × 11¼"	32 × 286 mm
2 × 4	1½ × 3½"	38 × 89 mm
2 × 6	1½ × 5½"	38 × 140 mm
2 × 8	1½ × 7¼"	38 × 184 mm
2 × 10	1½ × 9¼"	38 × 235 mm
2 × 12	1½ × 11¼"	38 × 286 mm
3 × 6	2½ × 5½"	64 × 140 mm
4 × 4	3½ × 3½"	89 × 89 mm
4 × 6	3½ × 5½"	89 × 140 mm

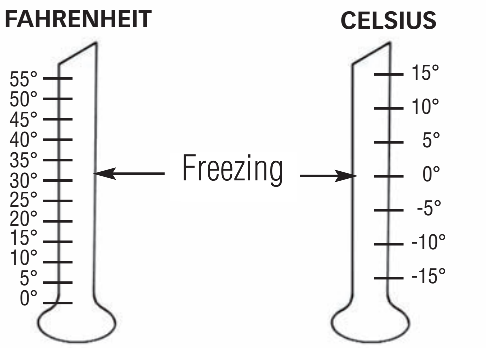
Liquid Measurement Equivalents

1 Pint	= 16 Fluid Ounces	= 2 Cups
1 Quart	= 32 Fluid Ounces	= 2 Pints
1 Gallon	= 128 Fluid Ounces	= 4 Quarts

Converting Temperatures

Convert degrees Fahrenheit (F) to degrees Celsius (C) by following this simple formula: Subtract 32 from the Fahrenheit temperature reading. Then, multiply that number by 5⁄9.
For example, 77°F - 32 = 45. 45 × 5⁄9 = 25°C.

To convert degrees Celsius to degrees Fahrenheit, multiply the Celsius temperature reading by 9⁄5. Then, add 32. For example, 25°C × 9⁄5 = 45. 45 + 32 = 77°F.



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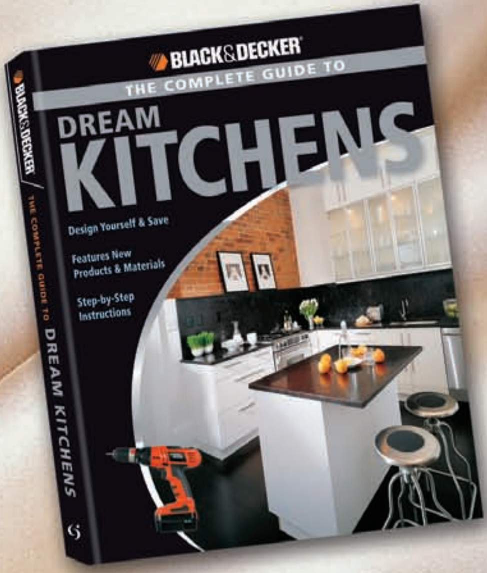
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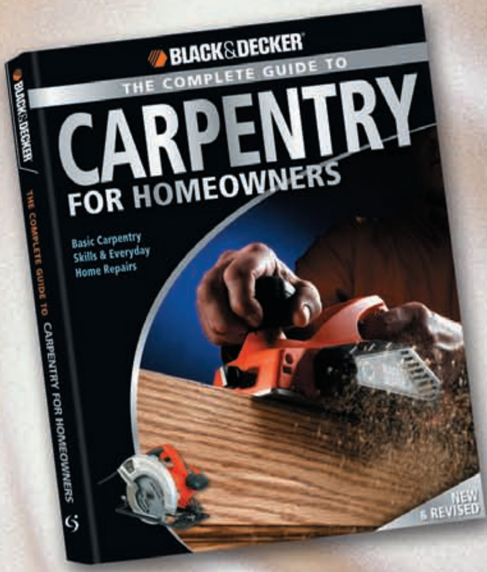
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